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IMPORTANT ANNOUNCEMENT

The great success attained by the Surgical Clinics of Chicago and by the Medical Clinics of North America has induced us to respond to the demand from all over the country to begin the publication of

THE SURGICAL CLINICS OF NORTH AMERICA

With the current number (December 1920) the Surgical Clinics of Chicago ceases as a separate publication and will be merged into THE SURGICAL CLINICS OF NORTH AMERICA. The first number of the Surgical Clinics of North America will be published in February 1921 and each succeeding number every two months. Each number will be devoted exclusively to the work at one great surgical center.

The Philadelphia number (February 1921) will record the work of the leading surgeons there connected with the University of Pennsylvania, the Jefferson Medical College, and the Graduate School of the University of Pennsylvania.

The New York number (April 1921) will include the work done at the various hospitals by the surgical department of Columbia, Cornell, Bellevue, and the Post graduate School.

The Boston number (June, 1921) will include Harvard, Massachusetts General Hospital, Boston City Hospital, Peter Bent Brigham Hospital and Free Hospital for Women, etc. etc.

THE SURGICAL CLINICS OF NORTH AMERICA will be kept up to the standard that has been maintained in the Medical Clinics of North America and will follow the same general plan.

CONTRIBUTORS TO THIS NUMBER

EDMUND ANDREWE, M. D., Instructor in Surgery Northwestern University Medical School.

CARL BECK, M. D. Surgeon, North Chicago Hospital.

ARTHUR DEAN BEVAN, M. D., Professor of Surgery Rush Medical College in Affiliation with the University of Chicago; Surgeon to the Presbyterian Hospital, Chicago.

CARRY CULBERTSON, M. D. Assistant Professor of Gynecology and Obstetrics, Rush Medical College, Chicago; Assistant Attending Gynecologist and Obstetrician, Presbyterian Hospital, Chicago; Attending Gynecologist, Cook County Hospital, Chicago.

HARRY CULVER, M. D. Gynecologist to the Cook County Hospital, Chicago; Instructor in Urology University of Illinois.

VERNON C. DAVID, M. D. Instructor in Surgery Rush Medical College, Chicago.

DANIEL N. KIRKPATRICK, M. D., Clinical Professor of Surgery Rush Medical College, Chicago; Attending Surgeon, Michael Reese and Cook County Hospitals, Chicago.

DR. GATEWOOD, M. D., Instructor in Surgery Rush Medical College, Chicago.

ALLEN B. KANAVIEL, M. D., Assistant Professor of Surgery Northwestern University Medical School; Attending Surgeon, Wesley Memorial and Cook County Hospitals, Chicago.

HERMAN L. KRUTSCHMER, M. D. Urologist, Presbyterian Hospital; Assistant in Genito-urinary Surgery Rush Medical College, Chicago.

CHARLES MORGAN MCKENNA, M. D. Assistant Professor of Genito-urinary Surgery College of Medicine, University of Illinois.

HUGH MCKENNA, M. D. Senior Surgeon and President of Staff, St. Joseph Hospital, Chicago; Associate Professor of Surgery (Katholical), Rush Medical College, Chicago.

G. L. MCWORTHER, M. D. Instructor in Surgery Rush Medical College, Chicago.

ALBERT H. MONTGOMERY, M. D. Instructor in Surgery Rush Medical College, Chicago; Junior Attending Surgeon to the Presbyterian Hospital, Chicago.

ROY L. MOODIE, M. D., Assistant Professor of Anatomy College of Medicine, University of Illinois.

ALBERT J. OCHSNER, M. D. [I. D.] Surgeon-in-chief, Angstrom and St. Mary's Hospitals, Chicago; Professor of Clinical Surgery in the Medical Department of the State University of Illinois.

GEORGE E. SHAMBAUGH, M. D. Professor of Otolaryngology Rush Medical College, Chicago, Consultant to the Presbyterian Hospital, Chicago.

KELLOGG SPEED, M. D. Assistant Professor of Surgery, Rush Medical College, Chicago; Assistant Attending Surgeon, Presbyterian Hospital; Attending Surgeon, Cook County and President Hospitals, Chicago.

THOMAS J. WATKINS, M. D. Professor of Gynecology Northwestern University Medical School, Gynecologist, St. Luke Hospital, Chicago.

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SURGICAL CLINICS OF CHICAGO

Volume 4

Number 6

CLINIC OF DR. ARTHUR DEAN BEVAN

PENNSYLVANIA HOSPITAL

EXSTROPHY OF THE BLADDER

Summary: Various procedures designed for cure of exstrophy of the bladder. The Sonnenburg plan the method of choice. Application of this method to the patient presented for operation—technic. After-history of case.

It is my intention this morning to present to you the subject of exstrophy of the bladder and to operate upon a case.

This patient is eleven years of age, a bright and fairly well-nourished boy. He has been referred to me by an old colleague of mine who is now practising in Texas. You will see, on examination, that there is a cauliflower or possibly one might better describe it, a tomato-like mass projecting above the symphysis in the region of the bladder. As you examine this carefully you will note that this mass is the mucous membrane of the posterior wall of the bladder. The anterior wall is entirely absent. At the lower portion of this mass you will notice occasionally urine coming out in small spurts from the open mouths of the two ureters, and just below the ureters is situated a small rudimentary penis, which is also malformed and presents a complete epispadias. An x ray picture of the pelvis in this child shows a failure of union of the pubic bones. They are separated a distance of about $\frac{1}{4}$ inch or more. This is the usual condition in these cases of exstrophy. The child has a double hernia and double undescended testes.

I have operated on a good many of these cases of exstrophy of the bladder and have tried out the various plans of operation that have been suggested from time to time. I might before proceeding to etherize and operate on this patient give you a short sketch of the various plans that have been worked out.

When I was a medical student and Gunn was in charge of our clinic the operation that was being experimented with was a plastic, in which an effort was made to build a new anterior wall for the bladder and to make some sort of receptacle for the urine. Three skin-flaps were usually employed in this effort. As a student I had an opportunity of seeing several of these cases operated on, and the results were very unsatisfactory. I could never satisfy myself that any benefit had been derived from these plastic operations designed to build a bladder from skin-flaps, and this evidently was the general conclusion, because after a short trial the operation was abandoned. The next step that seemed to promise something of value was the transplanting of the ureters into the intestines, especially into the sigmoid or rectum. This operation was at first regarded as a great step in advance, and a number of cases were reported, especially shortly after the operation, as being complete successes and quite wonderful cures. Within a few years however we soon learned that a majority of these little patients died from ascending nephritis. After the ureters were transplanted into the rectum or sigmoid an infection would gradually travel up the ureter to the kidney and the patient would sooner or later die as result of this ascending nephritis. On that account it was necessary to abandon the transplanting of the ureters alone. Then came the suggestion that we should transplant the entire base of the bladder into the sigmoid, the Maydl operation, Maydl's conception being that when he transplanted the entire base of the bladder with the protecting sphincter action at the lower end of the ureter this would prevent any ascending infection. There was probably some basis for this idea. In spite of that fact, however a great majority of these patients also died of ascending infection. The operation itself carries a good deal of risk—I mean the immediate operative mortality is large.

The next plan that was suggested that seemed to carry with it a good deal of value was the Peters operation, devised by a Canadian surgeon, Peters. It was a very clever plan of introducing the ureters into the rectum by the extraperitoneal route

The Peters operation is a very simple one, and it seems to me if a transplantation into the intestine is to be attempted in a given case the Peters plan should be selected. The steps of the operation are briefly these. Under an anesthetic the ureters are dissected out for a distance of 2 or 3 inches, and then, placing the patient in the lithotomy position, the sphincter is dilated and with a pair of closed artery forceps an opening is made from just above the symphysis, the original position of the ureters in exstrophy through the connective tissue to the anterior surface of the rectum just above the sphincter. The closed artery forceps is pushed through the rectum at this point, the blades are then opened, and a fair-sized tunnel is made. The two ureters are then stitched together by fine catgut sutures and are carried through this tunnel into the rectum and are then stitched with fine silk suture to the rectal mucosa. I should mention the fact that in this plan of Peters a good-size rosette of mucous membrane and tissue at the outlet of the ureter is dissected off with the ureter so as to attempt to retain as far as possible the sphincter action at the mouth of the ureter. After transplantation of the ureters into the rectum the mucous membrane covering the posterior wall of the bladder is dissected off completely and this huge defect in the anterior abdominal wall is then closed by invaginating the muscularis of the bladder with purse-string sutures and then covering this with skin-flaps.

I have done a number of these Peters operations, and some of them have been quite successful. I have several patients living some years after operation in comparative comfort. On the other hand, unfortunately many of these cases develop an ascending nephritis with an eventually fatal termination.

We come now to the next step in advance in this work, which, to my mind, has proved to be the safest and best plan that has been so far suggested. This is the operation introduced by Sonnenburg, of Berlin, and that is the operation that I shall perform upon this child this morning.

The patient is now anesthetized and I shall proceed to do the operation after the Sonnenburg plan. The first step is to

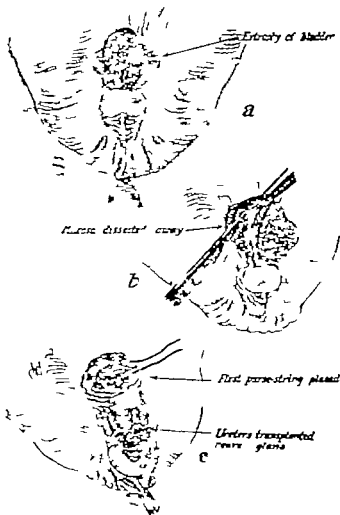


Fig. 342 —a, Condition before operation. b and c, Technique of operation.

isolate the ureters and to dissect them out, so that we can pull the completely freed ureter out from its bed for a distance of about 1 or 1½ inches. This is a fairly simple matter. I intro-

duce a fine ureteral catheter into each ureter and dissect out a small rosette at the outlet of the ureter and divide the mucous membrane over it. With careful dissection I am now freeing the ureter for a distance of about $1\frac{1}{2}$ or 1 inches on either side

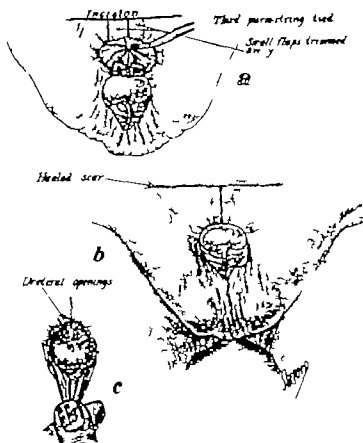


Fig. 343.—a Technique of operation b and c Result after operation

The purpose of the operation is to transplant the two ureters to the base of the epispadias, to then remove all of the mucous membrane of the bladder to invaginate the bladder muscularis in order to strengthen the abdominal wall at that point, and then

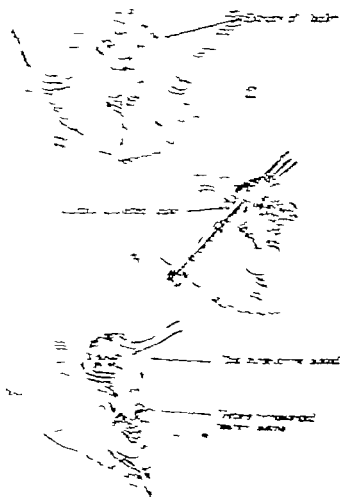


Fig. 10.—a. Condition before movement. b. Condition after movement.

under the knees and to draw them out so that we can pull the completely fixed member out from its bed for a distance of about 1 or 2 inches. This is a fairly simple matter. I know

epispadias. I would not advise operation for the hernia or for the undescended testes at present. After the boy has made a good recovery from his exstrophy operation we might consider correcting the hernia and malposition of the testicles. I would not at any time suggest any operative procedure for the epispadias, as it would be out of the question with the associated exstrophy.

After-history —The boy made an excellent recovery from the operation. Fortunately the skin-flaps lived and there was no necrosis. Union was practically by primary intention. He had for some days a low continued fever that worried me considerably and I thought of the possibility of a nephritis developing in his case. We could not at any time make out definitely any kidney involvement. He had some cough, and I am rather inclined to ascribe his temperature to a slight postoperative bronchopneumonia, although the physical signs of such a condition were not marked.

After he had made a complete recovery from the operation his mother became alarmed one day because he developed evidences of strangulation in the hernia on the right side. Fortunately however this was reduced, but I am inclined to believe that the risk of a recurrence of this strangulation will necessitate our doing a hernia operation in order to prevent any serious complications.

The problem is now one of devising the right sort of apparatus that will catch and retain the urine as it dribbles from this small epispadias opening. A good deal of ingenuity is required to fit a rubber flange over the opening so as to make it fairly water tight and keep the patient dry after these operations, and yet with a little care and study and the assistance of a good instrument maker this can be accomplished. Personally I am convinced that this Sonnenburg operation is the best procedure that we can employ in these cases of exstrophy that it is safe for the patient both from the standpoint of immediate mortality and from the standpoint of longevity. I believe that with proper care and attention these patients can be made more comfortable than by any other method of handling cases of exstrophy.

cover the raw surface with skin-flaps. After the operation has been made and wound healing is complete we have simply a small opening at the site of the two ureters and at the base of the epispadias. We have done away with all the raw surface of the bladder and have completely closed this with skin-flaps. This enables us to have the patient wear a rubber urinal in which the urine is readily collected and which he can attend to himself emptying it every few hours and seeing that it is kept clean and free from odor.

Proceeding with the operation, you will notice that it is rather difficult to dissect off the mucous membrane of the bladder and in order to make this easier I inject between the mucous membrane and the muscularis some sterile salt solution containing 1:100,000 adrenalin. This blows up the areolar space between the mucosa and muscularis and makes the dissection less difficult. It has this advantage, also, that the adrenalin controls to a large extent the bleeding. I have now removed all the mucous membrane and what projects out now is the muscular wall of the posterior half of the bladder. I have learned to handle that in a simple way. I invaginate this with three purse-string sutures just as I invaginate an esophageal diverticulum. I use the same principle also in invaginating the sac of a direct hernia. These three purse-string sutures are now applied one after the other and turn the bladder into the abdomen. I now make a T-shaped cut, one a horizontal incision just above the former line of the bladder mucosa and vertical one and free two rather large flaps of skin and superficial fascia which I carefully slide over the raw surface and hold them in position by sutures. You will see that we simply have at the lower angle a large T-shaped incision and at the base of the epispadias, projecting slightly the lower end of the two ureters. The rest of the raw surface is now completely closed. I have learned by experience that the best dressing for these cases is sterile zinc oxide paste. I put a rather thick coating of this oxide paste on a layer of gauze and cover the suture line. You will remember that I called your attention to the fact that this patient has a double undescended testes, a double hernia, and

ABSCESS IN THE DEEP CERVICAL FASCIA OF THE NECK

Summary: An infant three months old with a rapidly developing goiter producing pressure on esophagus and trachea. Aspiration reveals an abscess in the deep cervical fascia. Evacuation of abscess by the Hilton method.

My assistant, Dr. Gatewood, and my colleague, Dr. Grulke have just called my attention to a second case this morning that I shall present to you, first for your diagnosis, and second, probably for surgical operation.

This infant, three months of age has been referred to our service with the diagnosis of a very rapidly developing goiter producing pressure on the trachea and esophagus. As you look at this little chap you see a large swelling on both sides of the neck consistent in a general way with an enlargement of the thyroid gland. As you examine it, however you will find that whatever the swelling is it presses the trachea forward so that the trachea is very superficially situated, and of course, this is not the ordinary picture of thyroid enlargement. It must be a very atypical case and one in which the atypical thyroid is situated between the esophagus and trachea. This is, of course, sometimes the case but it is a great rarity. The little patient is starving to death because of the inability to swallow and as you see, this morning he is having great difficulty in breathing evidently because of pressure on the trachea.

The history given by the attending physician and parents is that he had first a sore throat. This sore throat was followed by the rather rapid development of what has been regarded as an enlargement of the thyroid gland. As I examine the neck carefully I find that in this enlargement a very definite fluctuation can be obtained, which is transmitted from the right to the left side. I believe that we may be able to obtain some evidence by introducing a hollow needle into the mass and seeing if we can aspirate any of the contents.

Injecting with a fine hypodermic needle $\frac{1}{2}$ of 1 per cent. novocain through the skin and superficial fascia and fairly deeply

Introduce alongside the aspirating needle a pair of closed artery forceps and open this abscess by the Hilton method, a method that should be employed always in these deep abscesses about the neck. One is much less apt to do injury to the important structures, such as the great vessels and nerves, by this method than he would if he used a knife and dissected directly into the abscess. Opening the artery forceps, a great gush of thick yellow pus comes out, covering the child, the clothing and the sheets in which we have wrapped it. You will notice that although my incision is on the left side, by a little pressure on the right side of the swelling I can also empty completely the right pocket, so that the swelling has now disappeared completely.

This case is now no longer a problem. It is clearly an infection, beginning as a sore throat, followed by infection of the soft tissues of the neck, possibly some lymphatic nodes, and resulting in the development of an abscess in the deep cervical fascia, as I have already said, in the compartment between the vertebrae and the esophagus, or between the esophagus and the trachea, forming in this way a huge hour-glass or dumb-bell-shaped abscess. Fortunately the pus was so situated that it did not pass into the posterior mediastinum or into the anterior mediastinum, in which event it would almost certainly have been fatal.

The case presents one of those problems that has to be unraveled not by laboratory methods, but by the methods that surgeons have learned in careful study of the gross clinical pictures of other cases, in the application of some of the principles that have been known for years, of palpation, which in this case detected fluctuation, the aspiration of the contents to determine the character of the fluid, and the employment of the Hilton method of opening deep abscesses of the neck. These are the things that have enabled us to save this little patient's life. They are the lessons in practical surgery that all must learn if we are to become successful practitioners of surgery.

After-history.—The little patient made a very rapid and complete recovery after drainage was instituted.

into the masses in order to benumb the tissues, I now take a good-sized aspirating needle and syringe and very carefully introduce it into the mass. When I withdraw the piston you will see the syringe filled up with a thick yellow pus. We evidently have to deal with a huge abscess under the deep cervical



Fig. 344.—Abscess in the deep cervical fascia of the neck in an infant three months old.

fascia, occupying the compartment in the deep cervical fascia which passes between the esophagus and the trachea or passes behind the esophagus, between the esophagus and the vertebrae. I now introduce through the skin and superficial fascia a fine knife, leaving the aspirating needle in position. I then

introduce alongside the aspirating needle a pair of closed artery forceps and open this abscess by the Hilton method, a method that should be employed always in these deep abscesses about the neck. One is much less apt to do injury to the important structures, such as the great vessels and nerves, by this method than he would if he used a knife and dissected directly into the abscess. Opening the artery forceps, a great gush of thick yellow pus comes out, covering the child, the clothing, and the sheets in which we have wrapped it. You will notice that although my incision is on the left side, by a little pressure on the right side of the swelling I can also empty completely the right pocket, so that the swelling has now disappeared completely.

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After-history —The little patient made a very rapid and complete recovery after drainage was instituted.

HYPERNEPHROMA

Summary: Difficulty of diagnosis in atypical cases of hypernephroma—absence of urinary findings not uncommon and frequently misleading. Complicated clinical pictures in hypernephromas which secondarily involve the liver. Bone involvement not an infrequent sequel of hypernephroma. History and operative findings in present case. Prognosis in these cases—use of the x-ray as important part of the after-treatment. After-history

YESTERDAY morning my colleague, Dr B W Sippy asked me to see a patient with him. He had been studying the case for about a month, but had been unable to arrive at a definite conclusion.

The man is about fifty years of age. He has been losing weight and strength very rapidly in the last few months. He has had more or less temperature and a fairly high leukocyte count. The case has been apparently studied from every possible angle. There are no stomach findings, no intestinal findings, a negative Wassermann, and nothing in the thoracic cavity. The urine examination is negative—no pus or blood. On careful physical examination of the abdomen a mass can be felt in the region of the left kidney. This mass is somewhat tender. The patient has had no pain. Dr Sippy had the patient cystoscoped by Dr Robert H. Herbst. Catheters were passed into both ureters and a careful examination of the urine obtained independently from the two sides without securing any evidence. The pelvis of the left kidney was filled with thorium solution and an x ray plate taken, which showed no defect of the pelvis. Dr Herbst's interpretation is that it is probably a case of tuberculosis of the left kidney. The x-ray picture shows very definitely the outline of the mass which one can palpate on the left side. It is a round mass attached to the lower pole of the left kidney. After submitting to me all the facts Dr Sippy asked me my opinion. I told him that I was unable to make a definite diagnosis if it was tuberculosis it certainly was atypical, but I thought, on the whole, the most probable thing was a hyper

nephroma. Dr Sippy advised strongly an exploratory and I agreed with him that that was the best thing that could be done in the case.

The patient is now etherized and I shall proceed to make the exploratory exposing the left kidney. I begin the oblique incision about a fingerbreadth above the crest of the ilium, passing upward and backward to the angle between the spine and the last rib (Fig. 345). This divides the skin and superficial fascia and the latissimus dorsi muscle. I expose now the posterior border of the external oblique and come down to the posterior layer of the lumbar fascia. Both of these structures are divided. I now come down to the anterior layer of the lumbar fascia, which is also divided, and I expose the fatty capsule of the kidney. Introducing both hands into the incision, I retract the tissues fairly widely from the same source, and in doing this I intentionally fracture the twelfth rib, which gives me a great deal more room. I have found by experience that it is better to break the rib with the hand than to resect it. One is much less apt to do any damage to the pleura. I come down to a large mass extending from the left kidney down toward the iliac fossa. I separate carefully the fatty capsule of the kidney from this mass and from the kidney proper, freeing the kidney first posteriorly and then in front, then the upper pole and then the lower pole, bringing the kidney and this mass out through the external incision. This mass is filled with some putty-like material, some of which escapes, because I have ruptured the capsule containing it in the force employed in delivering the tumor. The material is somewhat suspicious of the caseation of tuberculosis, and yet it seems distinctly different. I next clamp the ureter between two curved forceps and divide the ureter. Then I apply to the blood-vessels of the kidney a full-curved forceps which I employ in doing cholecystectomies, using it to clamp the cystic duct. I am very fond of using these forceps here in a nephrectomy because on account of the shape of the forceps it enables one very easily to apply the ligature (Fig. 345). I now divide the vessels distal to the clamp and deliver the tumor and the kidney. I have asked Dr Herbst, who has been very much interested in

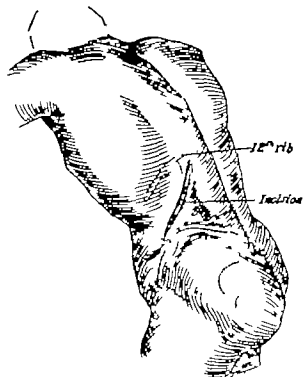


Fig. 345.—Incision for removal of kidney. Full-curved forceps applied to blood-vessels of kidney. The shape of the forceps permits of easy application of ligatures.

the case, to examine the specimen and to let me know his opinion of the pathology from a naked-eye examination.

Opening up the tumor as he does, you will see it is a typical hypernephroma, the round projecting mass from below being made up in part of solid hypernephroma tissue and partly of some softened material the result of a degenerative process. You will notice one interesting complication in this case, and that is, in the fatty capsule distal to the tumor there is what appears like a secondary tumor which I dissect out now going widely into what looks like normal fat. This is clearly an extension of the hypernephroma into the fatty capsule outside of the kidney itself. On splitting this open I find it has also undergone a degenerative process, the center of it having softened down into the same material that we found when we ruptured the main tumor. Inasmuch as this is clearly a hypernephroma, I come back now to the treatment of the ureter. I find that I have divided it well below the pelvis and at a safe distance from the tumor itself. I simply ligate the ureter without any attempt at excising it widely. I then ligate the renal vessels with medium-sized catgut. I place a second catgut ligature a little distal to the first and then remove the clamp. I find the bleeding is entirely controlled. Some blood-clots which have formed in the large cavity from which the kidney was removed are carefully mopped out, cigarette drains are left in the dead space, and the incision is closed with catgut through the muscles, silkworm-gut through the skin, superficial fascia, deep fascia, and superficial layer of muscles, and silk through the integument itself. The pads and sponges are all accounted for and the patient is in very good general condition.

I want to take this opportunity of discussing some of the practical points in connection with hypernephroma. I want to first make the statement that my medical colleagues and I have handled together a large number of these hypernephroma cases, and I think they will agree with me when I say that no other condition in the abdomen has given rise to so much uncertainty in diagnosis in some of the atypical cases as has the condition of hypernephroma with the secondary invasions that are very

often associated with it. Unless one is fairly familiar with this condition and has studied a large number of cases one is prone to expect with hypernephroma the occurrence of definite findings in the urine. Now as a matter of fact, in about 50 per cent. of the cases there are no urinary findings at all. Of course, in a certain number of cases we do have blood in the urine and sometimes extensive hemorrhage and sometimes the picture of typical renal colic from obstruction due to blood-clots in the ureter. On the other hand, one must not be surprised to find hypernephroma, even well advanced, that has not given rise to any urinary findings. In cases where we find extensions of the hypernephroma to the great vessels, to the liver and other portions of the abdominal cavity we may have singularly atypical pictures. Let me tell you of our experience.

An old classmate of mine came to me a few years ago complaining of the fairly sudden development of a marked varicocele on the right side. He had lost some weight and strength, but otherwise seemed to be in fairly good condition. Careful examination failed to reveal any definite explanation of the condition. Within a few weeks he had some blood in the urine. This alarmed him, and he came back to see me, and I found on examination a tumor developing in the region of the right kidney. At exploratory operation I found an already inoperable hypernephroma of the right kidney which had extended into the veins, blocked up the spermatic veins, and produced the marked varicocele.

Another case comes to my mind of a patient seen by Dr Sippy and myself, whose first signs of serious trouble was some process that blocked up the ascending vena cava with an enormous edema of the lower extremities, and eventually a collateral circulation relieving the condition somewhat. At an exploratory operation an inoperable hypernephroma was found.

Hypernephromas involving secondarily the liver give rise to complicated pictures suggestive sometimes of gall-bladder disease or carcinoma of the liver and pancreas. Another interesting group of cases is furnished by the extensive bone involvement secondary to hypernephroma. Some time ago a child, the

daughter of a physician, was brought to my service. She had been playing with some children at school. Suddenly she felt something snap in her hip and she fell to the ground. She was carried home and found to have a fracture of the upper end of the right femur. x Ray examination showed beautifully the characteristic destructive process due to the invasion of the bone by a malignant growth, and the process was found not only at the site of the fracture, but to very extensively involve almost the entire skeleton. After careful analysis of the case the tumor was found in one kidney. Later a little blood was found in the urine and the *termination* demonstrated distinctly the presence of a hypernephroma with secondary very extensive bone involvement.

Hypernephromas furnish the common type of malignant tumor of the kidney 75 or 80 per cent. of the malignant tumors of the kidney which we have had to deal with on our service have been hypernephromas, the sarcomas that occur in the kidney forming the second group in frequency carcinoma of the kidney being a comparatively rare lesion.

In regard to the prognosis I can give you these facts. In a report from the Hochenegg Clinic, made several years ago, of 34 cases in which nephrectomy had been done for hypernephroma, but 1 was alive without evidence of recurrence at the end of three years after operation. My own experience has not been as discouraging as this. We have had a number of apparently permanent cures after nephrectomy for hypernephroma. I am inclined, however to ascribe this, in part, to our insistence upon the use of the x-ray as a very important part of the after-treatment. The discovery of the peculiar salutary effect of the x-ray on hypernephromas was the result of the study of a case which I had with Dr Billings a number of years ago. After doing an exploratory operation on a patient with a kidney tumor removing a small section of the tumor for the purpose of diagnosis and finding the mass inoperable, we used the x-ray as the best means of palliation. *Much to our surprise and to our gratification* the very large tumor gradually and fairly rapidly disappeared. The patient improved very much in weight and strength and

went on to what appeared to be a complete recovery. Within a year however he developed evidences of secondary masses in the liver and finally died of the disease. The really enormous impression made upon the tumor by the x-ray encouraged us to use it in all of our cases after that time. In the cases that were inoperable we found quite consistently that the tumor diminished quite markedly under the use of the x-ray. In the cases where we can do a radical operation we employ the x-ray as insurance against return, or at least against a rapid return. We have had some very satisfactory experiences, such as this—nephrectomy for hypernephroma, recurrence at the site of the scar within six or eight months, and total disappearance of this recurrence under x-ray treatment, with the patient alive and well three or four years after the recurrence was first noted. From our experience I feel that we can say with a good deal of certainty that the x-ray has a selective action for the peculiar hypernephroma cells, somewhat the same sort of action that it has for the lymphatic tissue in Hodgkin's disease or the tissues of an enlarged spleen in leukemia. One must, on this account, not crowd the x-ray too rapidly because some of these patients suffer from a marked toxemia the result of too rapid breaking down of the tumor cells under the x-ray. One, of course, would not be warranted in trusting to the x-ray alone in cases of hypernephroma, the proper therapy undoubtedly being the removal of the tumor in operable cases and the subsequent employment of the x-ray. I have investigated its value in these cases, and I want to advocate very strongly its general employment.

After-history—The patient went on to a very satisfactory operative recovery. Within ten days we began the use of the x-ray as a means of prohibiting rapid extension of the growth, because we feel, on account of the extension outside of the kidney capsule in the fatty capsule, that there is little prospect of permanent cure. The after-history was of interest from the fact that the temperature which had for weeks been running from 100° to 101.5° F., and the marked increase in the leukocyte count both at once disappeared. Another fact of interest was the rapid increase in weight and strength the patient instead of

losing 8 or 10 pounds, as patients usually do in the two weeks following an operation, gained 8 or 10 pounds.

These facts, the disappearance of the fever and the increased leukocyte count, and the rapid increase in weight are all due to the same cause—*i. e.*, the removal of a rapidly breaking down malignant tumor which was producing a severe toxemia due to the absorption of the toxin from the degenerating neoplasm.

STONE IN THE CYSTIC DUCT

Summary Interesting problem in diagnosis furnished by a patient giving history of repeated gall-stone colic attacks, followed by period of comparative freedom from attacks and then by silent jaundice. Cirrhosis of the liver consideration in the differential diagnosis. Operation reveals stone in the cystic duct. Essential pathology Discussion of two cases presenting similar clinical pictures.

THE patient I shall operate on this morning is a woman of forty who has been under the observation of Dr. Ralph Brown for several months. She furnishes an interesting problem in diagnosis.

Five or six years ago she had a number of attacks of abdominal pain, coming on at intervals, located in the right upper quadrant of the abdomen, followed by tenderness over the gall-bladder region, which were quite consistent with having been attacks of gall-stone colic. For a number of years, however, she has had none of these attacks. She has not, however, been in very good general health. When she came under Dr. Brown's observation examination showed an enlarged liver and a definitely palpable spleen. She had lost considerable weight. There was the general picture of stomach and colon distress of moderate degree. The x-ray picture showed a shadow about $\frac{1}{2}$ inch in diameter in the region of the gall-bladder. This shadow was confirmed by repeated plates, and from its location and appearances seems, with a good deal of certainty, to be a gall-stone. Within the last two weeks she has developed jaundice. This jaundice, however, has been a silent jaundice and not preceded by any colicky attacks. You will remember however that I have already said that four or five years ago she did have definite colicky attacks that might have been due to gall-stone disease. The stools have been clay colored at times. The time coagulation of the blood is well within normal limits being about three minutes. On the whole, she is in fairly good condition and is a fair surgical risk.

The physical examination would rather lead one to make a diagnosis of cirrhosis if it were not for two facts—that she has a

losing 8 or 10 pounds, as patients usually do in the two weeks following an operation, gained 8 or 10 pounds.

These facts, the disappearance of the fever and the increased leukocyte count, and the rapid increase in weight are all due to the same cause—*i. e.*, the removal of a rapidly breaking down malignant tumor which was producing a severe toxemia due to the absorption of the toxin from the degenerating neoplasm.

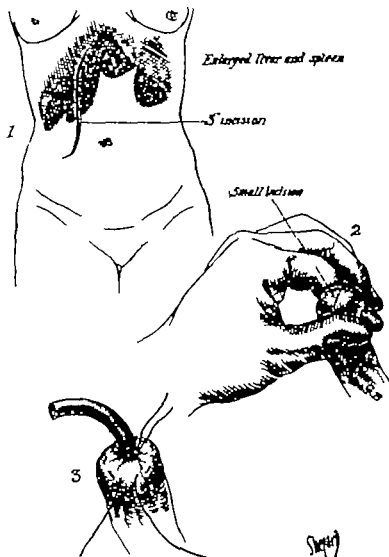


Fig. 146.—1, Diagrammatic sketch showing enlarged liver and spleen and the incision employed at operation. 2, Incision in fundus of gall-bladder through which stone is removed. 3, Drainage-tube inserted into gall-bladder and secured by purse-string sutures.

history of having had gall-stone colic attacks, and that she has this definite shadow of what seems to be a gall-stone. I mean by that that the very marked enlargement of the liver the enlargement of the spleen, and the development of the silent jaundice are more in keeping with infection of the liver with resultant cirrhosis than with a cirrhosis due to obstruction of the common duct.

Dr Brown and I have discussed the case in all of its phases, and feel that it will be wise for us to make an exploratory operation, and if conditions are found that can be removed and the patient cured, this, of course, is to be done. One cannot exclude in a case of this kind the thought of a possible carcinoma.

The patient is now prepared for operation. We might do this operation under local anesthesia, but it seems to me wisest, as there are no contraindications, to do it under drop ether. I am making a large S-shaped incision through the right rectus (Fig. 346, 1). As I open the peritoneal cavity I find no free fluid, although physical examination of the abdomen made me suspect that we might find a small amount of fluid. The liver is very large and extends a handbreadth below the costal arch (Fig. 346 1) is nodular and presents the appearance of being separated by new connective tissue into a number of irregular nodular masses. There is no evidence of carcinoma or syphilis of the liver. The gall-bladder is fairly normal in appearance, long, flabby and a bit opaque, and the walls are slightly thickened. Introducing my hand along the gall-bladder I find in the neck of the gall-bladder or in the cystic duct a stone of the size shown in the x-ray. It is quite evident that the shadow found in the x-ray is the stone which I now feel. I cannot feel any stone in the common duct. Examining the pancreas, I find it thickened, evidently a chronic interstitial pancreatitis, very definite, and very marked. I do not believe, however that there is much probability that this enlargement is carcinoma. The spleen is enlarged and extends well below the costal arch and can be easily felt on the left side of the abdomen (Fig. 346 1). There is no evidence of any lesion of the stomach or duodenum or of the intestine. As I examine the gall-bladder I find that with a

to the gall-stone disease the woman has had a chronic infection of the bile tracts, and secondary to the chronic infection of the bile tracts a chronic interstitial pancreatitis and a chronic infection of the liver and spleen, that these three lesions, the pancreas, spleen, and liver probably have gone along hand in hand, and finally the chronic interstitial pancreatitis has reached a point sufficient to produce obstruction of the common duct with obstructive jaundice. If this explanation is correct we have, I believe, a very fair chance of curing the patient by removal of the stone and by gall-bladder drainage. One must admit several other possibilities at least two present themselves to my mind, that the woman has a chronic infection of the liver with resultant cirrhosis and with resulting enlargement of the spleen, independent of the single gall-stone which we have removed, and that this may be simply an incident of little importance. Another possibility is that we have to deal with a carcinoma of the pancreas, which I believe, however is simply a remote possibility with an associated infection of the liver and spleen.

This case reminds me very much of a case which I recently had with my colleagues, Dr James B Herrick and Dr Charles Herbert Parkes. The patient, a man of sixty two was seen first by Dr Parkes. The only history that could be obtained was one of repeated chills and fever simulating malaria. For a time there were no other pieces of evidence upon which to hang a diagnosis. I saw the patient with Dr Herrick and Dr Parkes in consultation, and I thought of the possibility of a septic thrombus, possibly a septic thrombus of the portal vein from some unknown cause the possibility of malaria having been gone into carefully and no organism having been found and, in spite of that fact, he had been given the benefit of a very thorough course of quinin treatment. After an illness of five or six weeks he began to be jaundiced. The patient would never admit that he ever had any pain. He stated on repeated cross-examinations that at times he had a sense of discomfort in the upper abdomen, relieved somewhat by belching, and yet I could not help but feel that he belittled the character of these spells, and finally in

little force I can move the stone back from the little pocket it occupies in the neck of the gall-bladder or cystic duct into the gall-bladder proper. I think, on the whole, good surgical judgment would indicate doing a cholecystotomy removing the stone, and draining the gall-bladder rather than doing a cholecystectomy with hepaticus drainage. We can, as you see, very easily hold the fundus of the gall-bladder up with two curved forceps and wall the gall-bladder off with abdominal pads. Holding the small stone in the fundus with my thumb and index-finger of the left hand I make a small incision (Fig. 346, 2) through the gall-bladder wall directly down to the stone and push the stone out of the gall-bladder. This is followed by a flow of rather dark tarry bile. After removing the stone I introduce a good-sized rubber tube, about as large as a No. 16 American catheter into the gall-bladder and stitch it in position with two purse-string sutures of catgut (Fig. 346, 3). There is one unusual feature about this case, that is, you notice the gall-bladder with the tube projecting from it occupies an unusual position well below the costal arch, about midway between the costal arch and umbilicus. In the ordinary case of draining the gall-bladder the gall-bladder is situated very close to the upper end of the incision. Here it is 3 or 4 inches lower than the usual position. The abdominal wall is closed in the usual way.

To my mind this case furnishes a good deal of food for thought and for speculation. To review briefly what we have found, we have here a woman of forty who four or five years ago had gall-stone colic attacks, then was fairly well, then presents herself with the picture of loss of weight, rather vague abdominal distress, with the gradual and marked enlargement of the liver and spleen, and later the development of a silent jaundice, with an x-ray picture showing the presence of a single gall-stone. Laparotomy shows that the stone is not in the common duct, but in the neck of the gall-bladder. What is the essential pathology of the case and what is the most probable interpretation of this sequence of events? In answer to that question I can simply give you my own impressions. They are these. That the primary lesion is a cholelithiasis or gall-stone disease, that secondary

valescence. He did very well for three or four days and then had almost complete suppression of urine for forty-eight hours. Finally under subcutaneous salt solution injections, he improved and went on to a good recovery. I have kept track of the case, and in the last few months he has improved very greatly and regained his former rather rugged health, showing that, beyond question, there is no carcinomatous element in the case, and yet from the gross clinical picture with the silent jaundice, distended gall-bladder and free fluid in the peritoneal cavity found at operation the chances seem to be very much in favor of carcinoma as the basic disease.

Yesterday afternoon a colleague of mine brought me his brother a Catholic priest, with much the same picture that we have found in these two cases—rather vague abdominal distress coming on at intervals, forming what the patient calls attacks of distress but not of pain, loss of weight and strength, enlargement of the liver and a definitely palpable and enlarged gall-bladder. During the last two weeks he has had jaundice, coming on, however as a silent jaundice. He gives no history of chills or fever.

After examining him carefully I want to tell you what I said to his doctor brother. I said that I felt that the chances were 8 or 9 out of 10 that he had a cancer that, on the other hand, I had found just such a clinical picture due to gall-stone disease and had been able to cure the patient by proper surgical intervention. I felt, therefore, very strongly that we owed it to the patient as a duty to give him the chance afforded by an exploratory operation. I would urge you to take the same attitude in handling your own cases. I dislike very much to do unnecessary exploratory operations. On the other hand, I would rather do a number of unnecessary exploratories rather than allow a patient to die without the benefit of proper surgical therapy for some condition that could be removed, such as gall-stone disease. And then, too not infrequently in incurable cases drainage of the gall-bladder or a cholecystenterostomy as palliative operations may afford the patient great relief, especially from the distressing itching that is associated with jaundice in these cases.

talking with him he referred to these spells as attacks lasting for an hour or two. Pinning him down, however very closely he refused to admit that they were attacks of pain. I believe, however that there was a mental attitude on the part of the patient to belittle the character of the attacks, as he was very loathe to undergo any operation. A short time after the development of the jaundice at a second consultation I could feel the distended gall-bladder. The man had lost a great deal of weight and the question of diagnosis in the case swung between obstruction of the common duct by stone and carcinoma. The possibility of syphilis of the liver was carefully considered. A Wassermann was obtained and it was negative, the patient denying any possibility of any syphilitic lesion.

On the advice of the two other consultants and myself the patient finally agreed to an operation. He was operated on very much as we did in this case this morning. I came down to a distended gall-bladder containing bile, and on careful examination of the common duct I could find a stone about as large as an olive pit. This was quite freely movable. It could be felt and then would slip from under the fingers and be lost for a time. When we opened the peritoneal cavity we found some free fluid which distressed me very much, because I thought, of course, of the probability of carcinoma. In that case I removed the gall-bladder which was greatly distended, opened the common duct, and removed the stone with a gall-stone forceps. The stone was an oval one, not faceted, and very soft, almost like putty. I passed a probe from the common duct into the duodenum to make sure that the common duct was patent and put a good-sized tube into the common duct for drainage, introduced a cigarette drain down to the stump of the gall-bladder and placed a piece of iodoform gauze over the raw surface of the liver from which the gall-bladder was removed, as there was a little continuous oozing from the surface.

Opening the gall-bladder in that case I found a small stone in the cystic duct and was glad on that account that we had done a cholecystectomy. The pancreas was enlarged, very much as in the case this morning. The man had a very stormy con-

STONE IN THE KIDNEY: REMOVAL BY PYELOTOMY

Summary: Patient presenting clinical and roentgenologic evidence of stone in the pelvis of the kidney. Technique of removal. Discussion of second case in which the stone could not be located at operation. Necessity of developing technique by which a pyelotomy can be done with the kidney *in situ*.

THE patient I shall operate on this morning is a young man of twenty-five who comes with the history of having had a number of attacks of renal colic on the right side. He has seen several physicians, and has had two sets of x ray plates taken at different times, all of them showing the presence of a stone about as large as a small cherry apparently in the position of the pelvis of the right kidney. x Ray examination of the left kidney and of both ureters and bladder failed to show evidence of any concretions. We have made it a rule in this clinic to give stones not larger than a coffee berry an opportunity of passing out through the ureters and bladder unless there is some threatening complication. This stone is considerably larger than a coffee berry being three or four times the size of an ordinary coffee berry. Because of that fact I have told the patient that it would be wiser and would, in fact, be safer for him to at once have a pyelotomy done and have the stone removed than it would be to wait for the possible passage of the stone through the natural routes.

The young man's general condition is excellent. There is no contraindication in any way to ether anesthesia, so we shall select drop ether as the anesthetic in the case. You will notice that the boy is a large, muscular fellow rather short coupled, square built, with not much space between the last rib and the crest of the Ilium, and with quite thick, muscular abdominal walls. In operating on these cases I like to have three assistants and have the patient placed on the sound side on the table on a good-sized pillow under the pelvis so as to increase the space between the last rib and the crest of the Ilium (Fig. 347). I

have one of the assistants hold the limb on the side to be operated on so that the leg is at a right angle to the thigh and the thigh at a right angle to the body and then elevate the knee off the table so that it is 12 or 15 inches above the other knee. This rotation of the pelvis also increases the space between the last rib and the crest of the ilium. I have learned to prefer this method of increasing the space between the rib and the ilium to the operating tables that are on the market with an attachment for kidney work, the purpose of which is to elevate the pelvis by a broad metal strip which can be raised or lowered by a ratchet, so as to separate the rib and the ilium on the operated side.

The patient is now anesthetized and I make a long oblique kidney cut extending from the angle between the last rib and erector spine muscle obliquely downward and outward a finger breadth above the crest of the ilium. This cut divides the skin and superficial fascia and the latissimus dorsi muscle and exposes the iliohypogastric nerve which we attempt to avoid. The incision is carried forward, going through the external oblique muscle at its posterior border and the layers of lumbar fascia which extend from the erector spine and quadratus lumborum muscles forward to the flat muscles of the abdomen. I now come down to the fatty capsule surrounding the kidney. I find that I have not sufficient space, so I continue my incision downward and outward parallel with the crest of the ilium until I have an incision 9 or 10 inches in length. I can now introduce my hand freely into the retroperitoneal space in which the kidney is situated and by blunt dissection with the gloved finger I separate the fatty capsule from the fibrous capsule of the kidney throughout its entire extent. I find, however that we have a very short pedicle. By that I mean the vessels of the kidney which I have to deal with. I cannot without using an undue and dangerous amount of force bring the kidney out on the surface through the external incision. I find, too, that the twelfth rib encroaches very much upon my operative field. Without any hesitation I grasp the twelfth rib firmly with my right hand and pull upward, fracturing the rib at the neck, and en-



Fig. 347.—Technic of removal of stone in the pelvis of the kidney. The work is facilitated by having three assistants. Note the small incision in the pelvis through which the stone is removed.

wound. You will see that it is a mulberry calculus with a very roughened surface, about the size of the end of my little finger and too large under almost any circumstances to pass through the ureter even though it were considerably dilated.

What shall we do now with the incision in the pelvis of the kidney? For a time we introduced a few stitches, but the wall of the pelvis is so thin the stitches were of little or no value, and were, in fact, a menace as furnishing a possible nucleus of future stones. Later we put in a stitch or two in the fat covering the pelvis. That, however we have also discarded. We now simply drop the kidney back in position and carry a cigarette drain to the incision in the pelvis and close the external incision.

This case has been a particularly difficult one, and, as often happens in surgical work, it has not occurred singly. Within the last six weeks we had a very similar experience which did not terminate as fortunately as the case we have operated on this morning. I want to refer to that experience because it was very instructive and was most distressing to both patient and surgeon. It was a case that I operated on before a group of surgeons forming an interurban surgical society. The patient was a large, very thick-set, square-built man, very short coupled, with short neck, large chest, thick abdomen and very massive abdominal muscles, and with very little space between the last rib and the crest of the ilium. The patient had been operated upon for kidney stone some years before. The surgeon who had operated on the case had operated on the left kidney and had not been able to find the stone and had removed the kidney. Later it developed that the stone had passed down into the left ureter and the x-ray now shows a stone impacted in the lower end of the left ureter just above the bladder.

For some months the patient had been having kidney colic on the right side in the remaining kidney. He was seen by my colleague, Dr. Herrick, who brought him to me, and we both agreed that it was very important to have the stone removed from the solitary right kidney and I even assured the patient that it could be done without great difficulty.

abling me to elevate the upper part of the incision I think fully another inch, giving me a very much better exposure of the kidney. Even with this increased exposure I find it impossible to deliver the kidney. In most of my kidney operations where I do either a pyelotomy or a nephrolithotomy I am able to bring the kidney outside of the abdomen through the external incision. Occasionally however we meet with the same difficulty that we find in this particular case. I need trained assistants in handling this difficult kidney operation, and fortunately my assistants and myself have had some experience with similar cases. I shall have one assistant hold the twelfth rib at the side of the incision well upward and outward, another assistant retract the lower part of the incision, and then with a broad flat retractor which he can curve to any shape that is necessary I have my first assistant, Dr. Gatewood, hold down the fatty tissues, muscle, and fatty capsule so that he can in this way expose the posterior surface of the pelvis of the kidney. The kidney as you will see, is still entirely within the abdomen and it is necessary for me to do this pyelotomy inside of the abdominal cavity.

Holding the kidney in my left hand with my fingers so placed as to push against the anterior surface of the pelvis, I now have my index- and middle fingers against the stone which I can distinctly feel in the pelvis of the kidney. Dr. Gatewood now holds this broad retractor so as to hold all of the tissues away from the pelvis and with the edge of the retractor close against the posterior surface of the pelvis. With a pair of dissecting forceps without teeth I now free the posterior surface of the pelvis of some fat and areolar tissue, doing this in this blunt way so as to avoid injuring any vessel. With the dissecting forceps I can now actually feel the stone, covered now simply by a thin wall of the pelvis of the kidney itself. Taking a short, sharp knife I cut down on the stone, making an incision about $\frac{1}{2}$ inch in length. I then introduce a pair of closed artery forceps in this small incision in the pelvis (Fig. 347) stretching this incision as I open them until I can push the stone out of the pocket. Then with a small pair of gall-stone forceps I lift it out of the

gradually went on to a good recovery the distressing feature, however of the case being that the stone was not removed, and remains as a serious menace, especially because of the fact that he has but this solitary kidney

I think that that experience and the one that we had this morning emphasize the importance of developing a technic which will enable us to do a pyelotomy with the kidney practically *in situ* or at least in those cases where it is impossible to bring it out through the external incision. One of the most important things in that technic is the use of a very broad metal retractor in the hands of an assistant who sits on a low stool or chair on the same side of the patient as the operator holding all the tissues down and out of the way while the operator holds the kidney in his left hand and incises the pelvis and removes the stone with the right. These difficult pyelotomies with the kidney practically *in situ* demand very wide exposure, and in securing that wide exposure I want to emphasize the importance of fracturing the twelfth rib and pulling it well upward increasing the operative field in that direction.

At the time of the operation I found, as we have found in this case this morning that it was impossible to deliver the kidney through the external incision. The kidney had undergone compensatory hypertrophy because it was doing double work and were about twice the size of a normal kidney. In addition to that, the build of the patient made this delivery very difficult, and the pedicle of the kidney that is, the vessels of the kidney was very short. I could not use any great amount of violence in bringing the kidney to the surface because of the fact that any serious damage to the kidney would almost certainly cause the death of the patient. In that case I did not hesitate to fracture the neck of the twelfth rib so as to increase the space and give me more room for the operation. I could feel the stone in the pelvis at the commencement of the operation without any difficulty but as I freed the kidney and brought it into view and attempted to do a pyelotomy as we have done in this case this morning, all of a sudden the stone disappeared and I could not relocate it. I felt in the ureter and could not feel it. I tried to feel it through the thick kidney tissue and could not do this. I tried to manipulate the kidney by gently pressing it to see if I could not bring the stone back into the pelvis, but was unable to do so. I then thought that I would do a nephrolithotomy and very carefully made an incision through the kidney substance into the pelvis and calices and attempted to locate the stone in that way. I was, however unable to do so. The operation was prolonged, there was considerable bleeding, and finally I made up my mind to simply introduce a catheter in the pelvis of the kidney and drain, and not do anything further for the time being. I discussed it with the surgeons who were present, one of the men being a recognized authority on genito-urinary surgery and he agreed with me that under all circumstances it was best to desist from any further effort at removal of the stone at that time.

The patient had a very stormy two or three days following operation. The first day there was almost complete anuria. The second day he passed a small amount of urine, and, fortunately on the third day he began to pass a fair amount, and then

CLINIC OF DR. KELLOGG SPEED

PRESBYTERIAN HOSPITAL

TENDON TRANSPLANTATION FOR WRIST DROP

Summary: A new method of tendon transplantation for wrist-drop resulting from musculospiral paralysis. This method more advantageous than the ones previously devised. Technique.

In 1916 I described an operation (Surgical Clinics of Chicago I 1 187) for the temporary relief of paralysis of the musculospiral nerve. This consisted of a transplantation of one-half each of the flexor carpi radialis and ulnaris tendons, respectively into the base of the second and fifth metacarpal bones, while the hand was held in hyperextension. It was intended as a temporary measure to overcome wrist-drop to prevent the flexor muscles from becoming overstrong and to prevent also the extensor group from becoming overstretched and losing tone. The indications for this operation were first, to avoid the constant wearing of a cock-up splint to hold the hand in extension second, it was intended that when the proper time arrived the nerve could be sutured and return of function in the muscles causing drop-wrist would finally arrive to find the hand and wrist in favorable position and condition for a quick recovery. That operation was devised in France during war service with the British Army and was meant to apply to men with suppurating wounds which precluded an early nerve suture. Where there is an infected wound of either the soft parts or bone and nerve, the time when nerve suture can be attempted is quite remote.

This operation was of use in civil as well as military cases during the two- or three-year interval before nerves could be sutured and regeneration could follow. It did not, however furnish any extension power for finger-drop

a tendon transplantation using muscles with intact innervation which can be spared from their proper use to substitute for the inactive muscles named

The hyperflexion of the wrist must be considered as the basis for the disability of wrist-drop. The fingers in that position cannot grasp or otherwise act to full advantage. One cannot make a fist or get but a small proportion of the power of the finger flexors. If we can cause an ankylosis of the wrist, in line with or slightly extended from the forearm, the use of the hand is much greater than if we have a drop-wrist. This presupposes, of course that the finger motions are free. To ankylose the wrist in such a position it is not necessary to perform an arthrodesis. An artificial ligament on the dorsum of the wrist can be made by a flap of transplanted fascia lata attached to the third and fourth metacarpal bones distally and to the radius and ulna proximally. Following this one transplanted flexor tendon, such as the flexor carpi radialis, as used in Murphy's operation would give a useful hand. An adjunct donor for the abductor longus pollicis would be found in the transplanted palmaris longus.

There are other possible tendon transplantations, such as the flexor carpi radialis and ulnaris to the insertion of the extensor carpi radialis and ulnaris, but this leaves the thumb and fingers without tendon donor as in the temporary operation I have suggested. It is always a question whether attempts at re-education can make the flexor carpi radialis and ulnaris act as extensors. We do not know whether they can become independent of central flexor impulses sent via the median and ulnar nerves, but we do know that the slight extension coupled with the fixation of the wrist in line with the forearm which follows after tendon transplantation permits the fingers to functionate better than in a position of flexion.

In the operation previously described for temporary relief we see the possibilities. The operation now discussed for permanent relief uses the flexor carpi radialis, the flexor carpi ulnaris, and the supinator. The flexor carpi ulnaris, which is innervated by the ulnar nerve is transplanted into the several tendons of the extensor communis digitorum, especially into the extensor

In 1915 Murphy (Clinics, IV No. 4 p. 680) published his method of tendon transplantation. He used the flexor carpi radialis alone, inserting it into all the three extensors of the thumb and then into the index and common extensor. The tendon was sutured in a V-shaped manner and was supposed to cause extension of all fingers, depending on the degree of contraction of the muscle. A transplantation into so many tendons must necessarily fail to permit any finer motions and must lack power for the distal tendons (ring and little finger). His illustrations fail to show that this tendon suture was performed with the hand in extreme extension, as it must be to allow for stretching and slacking after the attachment.

Since the publication of these operations there has been much progress in nerve surgery and in tendon transplantation for hopeless nerve injuries. It seems, therefore, that we should all know a suitable operation for overcoming wrist-drop in instances of complete and irremediable severance of the radial or musculospiral nerve. There are cases of both closed and infected open fracture, of prolonged osteomyelitis, or severe gumahot and other lacerating wounds where the musculospiral can never be sutured. For these patients wrist-drop is permanent. The temporary operation which I suggested brings some relief for wrist and finger-drop. However there are also more extensive steps which afford greater functional return and which are based on thorough mechanical and anatomic foundations.

When we study the musculospiral nerve from the standpoint of wrist and finger-drop we find that it branches into the posterior interosseous to supply the extensor carpi radialis brevis, the extensor communis digitorum, the extensor indicis and the three extensors of the thumb the abductor pollicis longus, extensor brevis pollicis, and the extensor longus pollicis. Consequently when this nerve is severed near the elbow we have a wrist-drop an inability to extend hand, fingers, and thumb. There may be some development of other muscles supplied by the median particularly manipulation of which by re-education seems to overcome partly this paralysis. We do not care to enter into that discussion at this time, but we do wish to arrange

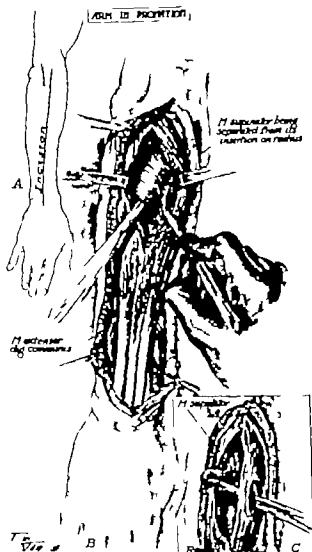


Fig. 348—A Incision on dorsum of forearm. B Forearm opened on the dorsum, extensor muscle belly split and supinator being freed from its insertion on the radius. The long incision is necessary for the tendon work that the wrist is to free the muscles that take up the slack when the suturing is performed. C, Supinator freed from the radius ready to be drawn through extensor bellies by hemostat when it is sutured later.

indicus and also the extensor longus pollicis. The flexor carpi radialis supplied by the median nerve, is transplanted into the extensor brevis pollicis and the abductor longus pollicis. These two transplantations supply power to extend hand and fingers and also to abduct and extend the thumb. It leads to a balanced hand and to independent full development of thumb motions.

To increase the effectiveness of the transplanted extensor power we call into use a third muscle—the supinator. This muscle arises mainly from the common tendon in front of the lateral epicondyle of the humerus and is inserted into the rough impression on the posterior and lateral surface of the radius. Its nerve supply comes from the ramus profundus of the musculospiral nerve. Its action is to supinate the forearm by causing the bone to revolve about its long axis. This muscle has considerable power. It is severed from its radial insertion, and its free end is transplanted into the belly of the common extensor while the hand is held in full extension.

To recapitulate, the flexor carpi ulnaris, supplied by the ulnar nerve takes over the work of the extensors, including the thumb. The flexor carpi radialis, supplied by the median nerve acts vicariously for the extension and abduction of the thumb and the supinator supplied by the ramus profundus of the musculospiral nerve, takes up the slack of the common extensors belly and reinforces their normal action established by the transplantation of the flexor carpi ulnaris at the wrist.

Technic of Operation.—First Step—Starting from just below the external condyle of the humerus while the hand lies in pronation, a long incision is made to the wrist, extending just below the level of the radial styloid (Fig. 348). Skin, superficial fascia and fat are dissected free lightly on each side.

Second Step—A split opening is made through the belly of the common extensor near the radius about 3 inches long starting just below the external humeral condyle and when this opening is retracted the obliquely directed fibers of the pronator

When the nerve is severed higher up than the origin of the supply to the supinator the pronator teres supplied by the median nerve may be employed, as in the Jones operation.

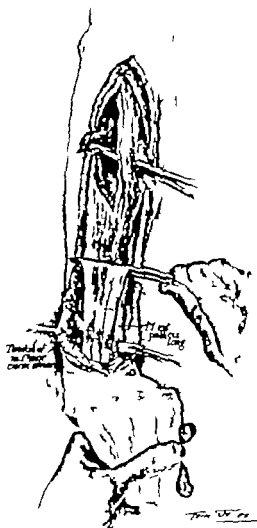


Fig. 390.—The flexor carpi ulnaris inserted into the split extensor tendon group. This tendon is usually redundant. Each extensor tendon must be sutured while held in full extension by the assistant. Note that the suture has not yet been drawn through for attachment.

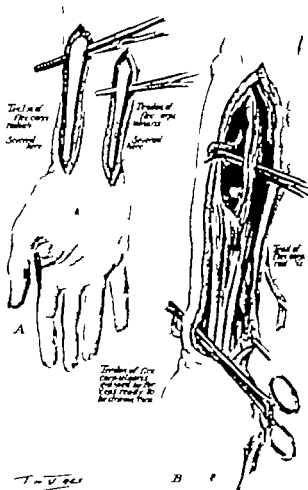


Fig 249—A The flexor tendons exposed off dors. their insertions. They are easily drawn through the subcutaneous fat on the dorsum of the hand for insertion as shown in B.



Fig. 332.—While the second assistant makes marked extension on the common extensor belly the operator pulls the supinator through the opening in the extensor belly and while holding it taut sutures it to the belly surface. The whole extensor muscle is then taut from elbow to finger ends.

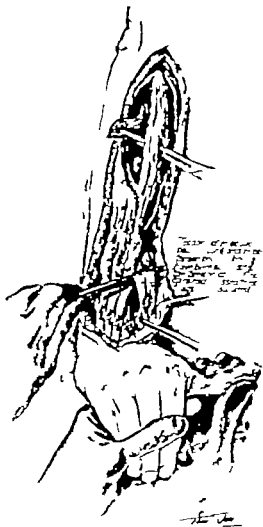


Fig 331—Note the slack in the extensor tendons above the point of transplantation. Each holds the distal portions taut. In the hand in full extension. The flexor carpi radialis is being attached to two of the thumb tendons.

in extreme extension and the thumb in abduction. It must remain in this position until the wounds are closed and a cock-up splint is applied. With the hand thus in full extension the tendon slips of the common extensor the extensor indicis, and extensor longus pollicis are freely exposed, lifted from their bed, and drawn taut. Each tendon slip is split and the ulnar flexor tendon is drawn through and tacked in taut position by linen or catgut stitches. Each tendon must be sutured in order and exact tightness of the distal portion must be maintained. The last tendon is the extensor longus pollicis. Usually there is a superabundant length of the flexor carpi ulnaris tendon, so that a small piece can be amputated after all extensor slips are fastened.

On the radial side the skin-flap is dissected enough so that the extensor brevis pollicis and abductor longus pollicis tendon are brought into view. The thumb is held in abduction and extension, these tendons are pulled taut, split, and the flexor carpi radialis tendon is slipped through them and sutured in this position.

Fifth Step —With the hand in pronation again the slack common extensor muscle belly is next pulled taut above the opening through which the supinator tendon has been drawn, and under full tension its severed end is sewn on to the extensor belly.

The wounds are closed, and the hand, still in extreme extension, is placed in a cock up splint *with the thumb abducted*. After two weeks stitches are removed, the splint is taken off for increasing periods each day but there should be no active attempts at use for five or six weeks. The patient is then urged to re-educate hand and wrist motions. An ultimately excellent functional use is the usual outcome.

are seen stretching toward their radial insertion. This muscle is gently lifted and freed on a Kocher director and is then severed for its full length at its insertion close to the bone. Lateral to the opening made in the extensor belly a second small opening a little more distal is bored by a Mayo scissors and the divided end of the supinator is drawn through the extensor belly and left attached to a hemostatic forceps.

Third Step—The hand is supinated. Two incisions are made on the flexor side of the forearm along the radial and ulnar margins, extending from the wrist upward about 3 or 4 inches.

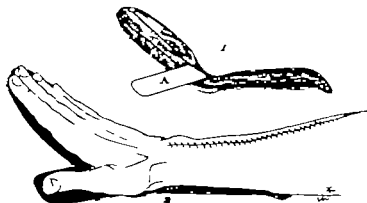


Fig 33—1 Diagram showing the cock-up splint with attachment for abducted thumb (A) 2, Hand in extension on the splint. Thumb abducted. Dorsal incision closed

The radial incision need not be so long as the ulnar. The flexor carpi ulnaris and radialis tendons are quickly and easily identified. They are severed as low down near their insertions as possible and then freed up toward their bellies. The ulnar flexor must be liberated somewhat higher than the radial.

Fourth Step—The hand is then returned to its pronated position and a tunneling forceps is driven along each outer aspect of the forearm just above the wrist. The two cut off flexor tendons are drawn through to the dorsum of the wrist on their respective sides. The hand is now held by an assistant

CLINIC OF DR. THOMAS J WATKINS

ST LUKE'S HOSPITAL

POSTOPERATIVE ATONIC ILEUS

Summary: Postoperative ileus resulting from general muscular atony. Value of intestinal drainage and intravenous injections of glucose in such cases.

THIS case is presented as it has some features which impress me as being of great interest and vast importance. The history is as follows:

Miss G. K., age thirty-six years, was admitted to St. Luke's Hospital April 19, 1920. Her family history was good. She had had the usual childhood diseases and typhoid fever at four teen years, but otherwise had enjoyed comparatively good health, though never very strong.

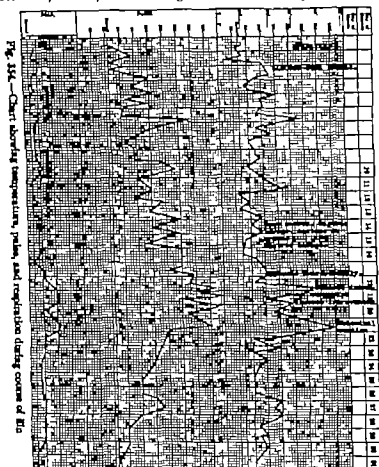
Present illness dates from December, 1919. At that time she had a profuse menstrual period which continued for about two months. The loss of blood confined her to bed for most of that time. She also had some nausea and vomiting during that period. Menstruations have been somewhat irregular and profuse since then. In January she had severe pelvic pains which have continued with variable severity since, but not enough to confine her to bed. Her clinical history otherwise was relatively unimportant. She had slight secondary anemia.

The diagnosis was bilateral salpingitis. Operation was made April 20th and the findings were: (1) Left tubo-ovarian abscess about 4 inches in diameter. (2) right salpingitis. (3) uterus retroverted. (4) numerous pelvic adhesions. (5) chronic appendicitis. (6) gall-stones.

Operation. Both tubes and left ovary and body of the uterus were removed. the appendix excised. the gall-stones were removed and the gall-bladder drained. The operation lasted one

sequent examinations of the urine failed to reveal the presence of acetone.

Diagnosis.—The cause of the abdominal distention, dilated stomach, nausea, and vomiting makes an extremely interesting



problem. Such postoperative conditions are generally supposed to result from intestinal adhesions following localized peritonitis. The postoperative condition here did not indicate a peritonitis, and the findings on secondary operation excluded peri-

hour and fifteen minutes and she was returned to her room in apparently excellent condition.

Recovery was fairly satisfactory for the first four days except for occasional vomiting. There was a slight bowel movement on the second day and free bowel movements on the fifth day. On the sixth day her temperature was 99.4° F and pulse 80 at 8 A. M. At 4 P. M. the temperature was 102.6° F and pulse 128. Glucose and soda enemas were started on the third day with the hope of preventing acidosis. She was able to take liquids in moderate amounts from the time of the operation, and on the sixth postoperative day was given selected diet, although there was occasional nausea and vomiting. The slight fever soon disappeared and the pulse remained 100 to 120. Her bowels moved satisfactorily with daily enemas, but considerable abdominal distention persisted.

On the sixteenth postoperative day the distention became suddenly worse. Gastric lavage was made and a small amount of fluid washed out. The following day the stomach was washed out twice and contained considerable fluids, the highest temperature was 103.4° F and pulse 144. The condition of the patient was serious on account of general weakness. Intravenous infusion of glucose was given on the seventeenth day with much benefit, and gastric lavage was continued. Numerous ampules of pituitrin were injected, with little or no benefit. In fact, I have failed to ever see very much benefit from the use of pituitrin for distention of the bowel.

On the twenty-eighth day an abdominal section was made under local anesthesia, with the tentative diagnosis of intestinal adhesions. The findings were only a distended ileum. The entire abdominal cavity was carefully explored and showed entire absence of adhesions. A drainage-tube was inserted into the ileum and retained by purse-string suture.

Following this all the nausea and vomiting disappeared. She was able to take food freely, obtained an abundance of rest and sleep and went on rapidly to recovery. The intestinal fistula was later closed.

Acetone appeared in the urine on the fourteenth day. Sub-

CLINIC OF DR. GOLDER L. McWHORTER

PRESBYTERIAN HOSPITAL

BIRTH FRACTURE OF THE HUMERUS RESET WITH THE AID OF THE FLUOROSCOPE

Summary: Difficulty of reducing fractures and maintaining position in infants.
Importance of the fluoroscope in setting fractures and in making later observations.

THE case of this infant, L. W. is illustrative of the group of birth fractures.

I was called in yesterday to see the fracture which had occurred during the night and had been put up in a temporary splint. The fracture of the humerus occurred in a breech delivery during a rather rapid forcible extraction. The arms were over the head.

The mother is a primipara forty years old.

On examination of the child I found the right arm firmly bandaged in splints. On removing them there was a false point of motion in the middle of the humerus and an overriding with a complete separation of the ends of the fragments. There was some swelling in the region of the fracture, but the ends could be easily palpated. One thing I looked for very carefully was evidence of a radial paralysis. I will discuss this subject again later. There was no evidence of paralysis. The baby moved the hand normally upward and downward.

In setting the fracture I manipulated the ends of the fragments so as to get them in as perfect alignment as possible, after ward bandaging the arm on a board splint placed across the back of the chest so that the humerus was held out laterally to the body. At the lateral end of this splint was another board extending upward for the forearm to rest upon. A child often

tonitis or intestinal adhesions. The question of acidosis can be excluded, as acetone only appeared in the urine on one day. This case is also important evidence of the value of glucose. Each intravenous administration of glucose was invariably followed by marked general improvement. A study of the case would indicate that without the use of glucose recovery would not have taken place. A review of the history might suggest that the secondary abdominal section should have been made sooner. It would have been of value to her if this had been done. The delay was the result of continued daily hope of an improved condition. The cause of the dilated bowel and stomach and of the consequent nausea and vomiting was undoubtedly a general muscular atony. She was a frail individual who required a prolonged operation, was considerably exhausted by post anesthetic nausea and vomiting, and unable to take sufficient food by the stomach.

SUMMARY

The specific interesting features in this case are:

1. The occurrence of the dilated stomach and intestines resulting from general muscular atony
2. The value of instituting intestinal drainage in desperate cases, which can be very easily and rapidly done under local anesthesia. This patient was in such desperate condition when the secondary operation was done that her father who was a physician, thought it impossible for her to live during the day
3. The great value of glucose in such cases and especially when given intravenously

Today I am going to reset the fracture with the aid of the fluoroscope. Few men avail themselves of fluoroscopic aid in setting fractures. I want to emphasize its value and also to mention the very great value of the fluoroscope in removing needles from the hands or soft parts. Frequently these are almost impossible to find. Some time ago in this clinic I described the technic of removing needles from the hand under the fluoroscope.

We will now go into the fluoroscopic room. I will handle the arm very gently after removing the splints and permit as little trauma to the soft parts as possible. Undoubtedly this is of as great value as is immediate immobilization in avoiding nerve paralysis.

By slight bending of the fragments with separation and re-impaction I am able to get the ends accurately approximated. Now putting the arm up again in the overextended position I watch the two ends through the fluoroscope. There seems to be some rotation of the lower fragment, consequently I am abandoning the original splint. I have seen excellent results from the treatment of fractures of the humerus in the overextended position, but I feel satisfied from the fluoroscopic examination that in this case some rotation takes place, although it apparently holds the fragments quite well.

In order to determine the best position in which to immobilize the arm I am moving it about. It seems to me that the best position is with the humerus slightly abducted and the forearm brought in flexed a little more than a right angle and held near the chest (Fig. 356). I will take a freshly folded plaster bandage, which I have in readiness, and fold it along the chest, axilla, and down the whole arm, bringing it out so that the hand will rest upon it. Since this plaster is still soft I am putting an ordinary wooden tongue depressor along the outer side of the humerus to help hold the fragments until the plaster hardens. I now bandage the splints, immobilizing all joints of the arm in this position. Fluoroscopic examination now shows that the fragments are in perfect alignment. Roentgenographic examina-

lies on its back with both arms in this position, and it has been advised by Ritchie as a good position in which to put the arm with a fracture of the humerus.

After setting the fragments and bandaging them an x-ray picture was taken, since they seemed to be in good position. The

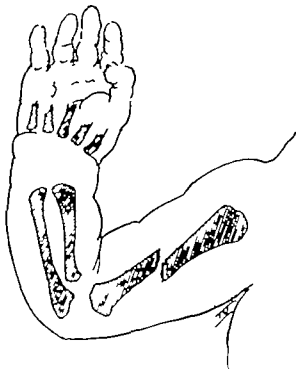


Fig. 353.—Roentgenogram before setting fracture under the fluoroscope. The fragments had been carefully approximated without aid of the fluoroscope and the arm is held in splints.

picture (Fig. 355) shows that the ends are not in complete apposition. While undoubtedly a good functional result would occur yet it is quite simple by the use of the fluoroscope to get the ends exactly in apposition, put the bandage on, and to know that they are held there by subsequent fluoroscopic examinations.

escape notice, and for this reason the two injuries cannot be compared. There were 39 fractures of the humerus in 37 infants. These were incidental to more than 33 000 deliveries. 24 of these were produced during breech extraction as in my case. 7 were attributed to difficulty with the arms at the pelvic outlet in vertex presentations, while in 2 cases the cause was not determined.

The site of the fracture was invariably at or near the center of the shaft below the insertion of the deltoid muscle. The line of fracture was transverse in all cases but one, and the fracture was complete in all cases. Contrary to popular opinion, there were no greenstick fractures of any bones discovered at birth. There were two types of deformity seen in fractures of the humerus: one a sharp outward angulation of the fragments, and the second (infrequent) a lateral displacement without angulation, the fragments parallel but separated. He does not mention a combination of these although the weight of the arm and traction of the muscles, especially the deltoid, would seem to me to produce an unstable deformity unless immobilized by splints. The angulation, Truesdell states, is more commonly seen in the anteroposterior view than in the lateral view. Overriding of fragments in the humerus was unusual, as compared with fractures of the femur.

One interesting observation in this case which differs from those of Truesdell, is that there is no evidence of a radial nerve paralysis. Truesdell states that in every case there was noted some degree of radial nerve paralysis, indicated by a distinct wrist-drop. This was present from the time of delivery and so could not, he thinks, be due to pressure of extravasated blood or of course, callous formation. The paralysis cleared up in all cases usually in a few weeks.

A dangling arm in the newborn according to Truesdell, may be due to six common causes. These are: fracture of either the clavicle or humerus; dislocation of either the upper or lower humeral epiphysis; Erb's birth paralysis, and an active syphilis in the form of a specific periostitis, readily shown upon the Roentgen plate.

tion will be made again in a few days since there may be some change in position.

In discussing birth fractures I want to review a recent book on Birth Fractures and Epiphyseal Dislocations by Truesdell, published by Paul B Hoeber New York, 1917 His work undoubtedly deserves great praise, but he makes no mention of the use of the fluoroscope as an aid in the setting and following

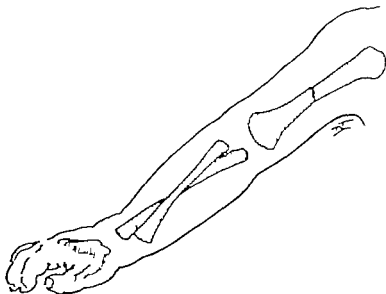


Fig 356 —Roentgenogram of fractured humerus following reduction under the fluoroscope.

up of these fractures. The fluoroscopic examination is of great est value in setting the fracture, but it is also important where there is difficulty in getting a roentgenogram in two planes after splints have been applied.

Truesdell derived his material almost exclusively from the Lying-in Hospital, New York, during a period of six years. He states that the humerus is the bone most frequently broken during delivery. However some fractures of the clavicle may

corresponding degree to afford abduction of the thigh. This may be summed up as a mobile vertical extension.

The explanation of the disappearance of the angulation deformity is more apparent from the observations on dislocation of the epiphysis of the long bones.

Following unreduced dislocation of the lower epiphysis of the femur Truesdell observed by serial roentgenograms that callus was thrown out extending from the newly located epiphysis up along the shaft of the femur. This callus gradually merged into the shaft about halfway up the femur. This new shaft, he thinks, is formed beneath the stripped-up periosteum and including a portion of the original shaft, the superfluous part of the latter being absorbed. Following separation of the lower femoral epiphysis the shaft and also new femoral condyles have been found to re-form in their normal relation to the epiphysis. Absorption of the old superfluous bone takes place more slowly with a beveling off of the protruding part of the diaphysis. In this way the displaced epiphysis will be reinstated in its normal position at the lower extremity of the shaft of the long bones. He observed that this change occurred also in the humerus. It seems to me that these observations are very valuable. The exact changes taking place may be open to academic discussion, but the results obtained are evidenced by serial roentgenograms.

The question of stripping-up of the periosteum seems to me to be highly theoretic. I think that it is possible for reconstruction of the shaft to occur without this complete stripping away.

As the ribs develop *in situ* by a deposit of new bone on one side and absorption on the other it would seem that they were following certain physiologic principles of developing along lines of resistance. Certainly the younger the epiphysis and the bone the greater the possibility of a perfect alignment following fractures of long bones as well as following the separation of the epiphysis with failure of replacement. This would explain the failure of growth correction of the deformity in older people where periosteal stripping away may be definitely shown to occur.

In the treatment of fractures of the humerus Truesdell recommends in the fresh fractures, putting them up without splint of any sort. A square of gauze is placed in the axilla and under the forearm and the arm is pressed firmly against the chest wall, after manipulation, if necessary to correct deformity and the forearm placed across the chest toward the shoulder of the uninjured side. A wide swathe of adhesive plaster is attached around the humerus and entire chest. The fractured arm is thus splinted against the chest. A Velpcean bandage is applied over the adhesive. The arm is roentgenographed through the dressing. The gauze bandage should be removed every day or two and the adhesive probably twice during the three weeks the bandage is worn until union is firm. Usually callus is shown in the roentgenogram about the eighth or twelfth day.

There were no instances of non-union in birth fractures of any of the bones.

A most important observation of Truesdell applies to prognosis as to deformity. This was determined partly by following up fractures of the long bones and partly after dislocations of the epiphyses of the long bones. In fractures of the humerus it was at first supposed that an angulation deformity would become exaggerated during childhood, since a bone angulated at its center and lengthening by growth at its extremities might display a constantly increasing departure from normal as it approached adult dimensions. Truesdell's observations show a progressive elimination of the deformity following birth fracture of the humerus. Deformities of the femur however were found to persist. The usual deformity as frequently seen in adults, is flexion of the upper fragment and a tendency also to external angulation with more or less overriding of the fragments. Consequently a lateral view is the most important in determining the presence of a deformity. It might be mentioned that Truesdell found that the best results in treatment of fracture of the femur were obtained by placing the infant in a small box with an upright board at the lower end. This board has an inclination of 10 to 15 degrees so as to flex the thigh slightly more than a right angle. The upright is also inclined laterally to a

After-history—Later examinations showed accurate approximation of the ends. The roentgenogram could not be taken in the lateral plane but fluoroscopic examination showed excellent alignment, although a slight angulation had occurred. This angulation is slightly anterior and not the usual lateral angulation found by Truesdell. The lateral view would be necessary to reveal the slight angulation. The anteroposterior roentgenogram (Fig 357) shows a very perfect alignment. The usual deformity is a lateral angulation due to the deltoid muscle abducting the upper fragment. This deformity would show on an anteroposterior roentgenogram. The splints were removed at the end of three weeks. Union was firm. The child used the arm normally by the end of a week, four weeks after the fracture.



Fig. 357 —The arm is held in position by means of a molded plaster cast splint. A short splint is also placed laterally to help retain the fragments.

CLINIC OF DR. ALLEN B. KANAVAL

WESLEY MEMORIAL HOSPITAL

THE AFTER TREATMENT OF INFECTIONS OF THE HAND

Synopsis: The most valuable asset of the working man is his hand. In infections of the hand it is the surgeon's duty not only to control the infection, but to see that proper and adequate after treatment is carried out. The first consideration in the operative treatment of infections of the hand is to make incisions in the proper locations and of sufficient extent to evacuate the pus of equal importance in the restoration of function is the after-treatment, which involves the use of active and passive motion, of hot baths, dry heat, massage, of suitable splints, and other mechanical aids.

It is my purpose today to present 3 patients who have suffered from infections of the hand and to discuss with you the after treatment in such cases. One of these is a patient who came to us five days after the development of an infection of the tendon sheaths of the thumb and little finger which rapidly involved the ulnar and radial bursa and was followed by the formation of a secondary abscess in the forearm. He was operated upon and after treatment immediately instituted, with the result that he is now able to fully extend and flex all the digits except the little finger. He has no limitation of motion at the wrist, and except for some slight limitation of extension of the little finger which does not incapacitate him in the least, he has regained the complete function of the hand.

The second patient is one who suffered from a severe infection of a similar nature, which was treated by inadequate incisions and, as it seems to me, without adequate care after operation. He came to us about a year after the infection with extensive adhesions and contractures (Fig 360-1) in the hope that something might be done in an operative way toward restoring the function of the hand.

Upon admission to the hospital his temperature was 102.2° F his pulse 96 and he appeared profoundly septic. The left hand and forearm were swollen to twice their normal size were red and tender. Over the palmar surface of the thumb were several small incisions from which thin pus exuded. The tissues were

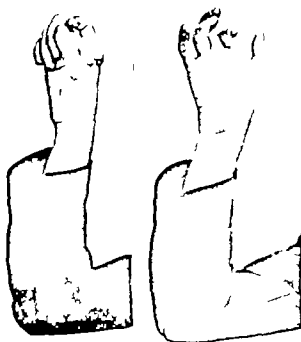


Fig. 359.—Case II. Condition of hand before operation. The illustrations represent the limits of flexion and extension.

particularly tense about the anterior annular ligament. On the palmar surface of the wrist were several small vesicles. The points of greatest tenderness, just as in similar cases which I have demonstrated to you, outlined very definitely the radial and ulnar bursa.

The third patient is suffering from a similar trouble which, however, has not involved the entire hand.

The history of these three cases is as follows:

CASE I.—This patient is forty-seven years of age and a janitor by occupation. Two months ago he scratched the palmar surface of his left thumb with a pair of pliers and sustained a

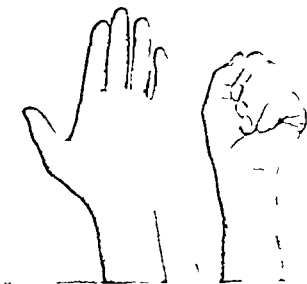


Fig. 358.—Case I. Condition of hand two months after operation.

slight laceration of the skin over the distal phalanx. A few days later the thumb became red and swollen, and within five days the swelling involved the palm of the hand, the wrist, and the lower two-thirds of the forearm.

Before entering the hospital he was attended by three different doctors, two of whom made small incisions in the thumb without relieving the pain or swelling.



Fig. 300.—Case II 1, Condition present before operation. 2, Dissection exposing the extensor tendons. 3, Appearance of head after extensor tendons have been freed from adhesions, free pad of fat is being placed about the tendons.

He was operated upon within an hour after admission to the hospital according to the methods we have discussed in previous clinics and after operation the entire arm and forearm were wrapped in a voluminous wet dressing. At the end of five days the band and forearm bath was substituted for the wet dressings.

He made an uneventful recovery and left the hospital with a slight discharge from the operative incisions two weeks later.

CASE II.—This patient is twenty-five years old, and a worker in the steel mills. On August 14th of last year he ran a nail into the distal phalanx of his left thumb. An infection developed which eventually involved the entire hand and forearm. Thirty-seven incisions were made over both surfaces of the hand and forearm during a period of three months. Drainage from various incisions persisted until December 15th.

You can see for yourself the scars of the numerous incisions on both surfaces of the hand and forearm, the shiny glossy appearance of the fingers and the marked limitation of motion of the fingers and thumb (Fig. 359). He has almost complete anaesthesia of the palm and fingers in the area supplied by the median nerve.

CASE III.—This patient is thirty-seven years of age and an instructor in chemistry in one of our universities. On October 8th of last year he cut the index finger of the right hand, near the metacarpophalangeal joint, on a piece of glass tubing. The wound became infected and was lanced on the third day after the accident. On the following day the wound was opened under an anesthetic and drains put in place. The infected area was irrigated with bichlorid solution, and at the end of a month the drains were removed. For a week thereafter the wound seemed to be progressing favorably when suddenly overnight it again became swollen and painful. On November 15th an incision was made from the metacarpophalangeal joint of the index finger over the thenar eminence to the carpal bones. Through this incision the infected area was again irrigated with bichlorid solution, and thereafter the infection gradually subsided. The e-

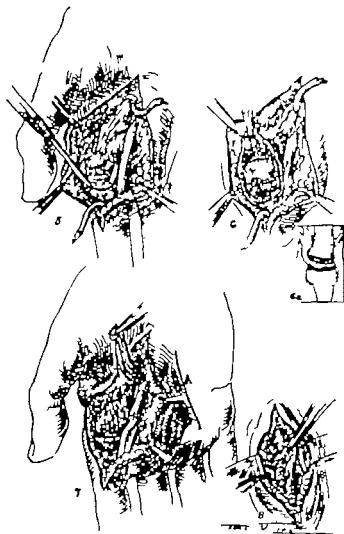


Fig. 362—Case III (continued) 5, Line of incision through the periosteum of the lachrym. 6, Resection of the distal portion of the second metacarpal bone, with the insertion of pedicled flap in the joint cavity. 7 Suture of the digital nerve. The lachrym bone is to be sutured to the periosteum on the radial side of the proximal phalanx. 8, Adhesions about the flexor tendons of the middle finger.

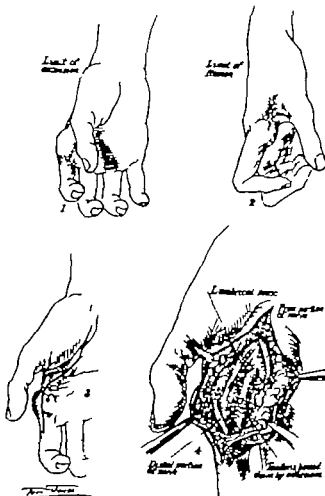


Fig. 361—Case III. 1, 2, Appearance of hand before operation. 3, Line of incision. 4, Appearance of soft tissues about the metacarpophalangeal joint, showing the involvement of the flexor tendons and digital nerve.

facts are elicited from the history since the patient was not under our care at that time.

You can see the condition of the hand which has resulted

tissue abscess or tendon sheath infection, complete function may be restored if proper after treatment is instituted promptly.

The general principles of treatment after operation consist in the institution of proper drainage, of active and passive motions, the use of hot baths, dry heat, massage, of suitable splints, and of various other mechanical aids for the restoration of function.

Too much stress has been placed by writers upon considerations as to the type of drainage material that should be used. The essential thing is that proper and adequate incisions be made that will permit free evacuation of the pus, and that these incisions be kept widely open for at least forty-eight hours. Ordinarily no drainage material of any kind is necessary. At times its use is indicated, particularly in those cases in which, because of the creases and folds in the hand, there is a tendency for the edges of the incision to become approximated. Some non-absorbable material, such as thin rubber or strips of old rubber gloves, which keeps the wound edges separated, is all that is necessary. Such a drain prevents the pus and coagulated serum from obstructing the wound opening and can be removed without pain. If there is considerable oozing after operation it may be advisable to pack the wound loosely with gauze saturated with vaselin. This can be removed at the end of twenty four or forty-eight hours with very little pain. If at the end of seventy two hours the hand does not show marked improvement, it is evident that some pocket has not been drained.

TREATMENT AFTER OPERATION

Passive and Active Motion.—Clinically we recognize two common types of hand infections—those due to the streptococcus, and those due to the staphylococcus and similar organisms. In both types it is of the greatest importance that active and passive motion should be begun as soon as possible after drainage has been instituted. In the staphylococcus infections at the end of thirty-six hours or at the most, of forty-eight hours the patient should be urged to use his fingers for ten or fifteen minutes two or three times a day—flexing, extending, adducting

from this infection (Fig. 361 1 2). There is numbness along the radial border and palmar surface of the index finger; atrophy of the soft tissues on the radial side of the index-finger and an ankylosis at the metacarpophalangeal joint. In addition to the involvement of the index-finger there is a marked involvement of the middle and ring fingers.

It is evident that a discussion of the treatment of infected hands includes not only the subject of immediate surgical care,

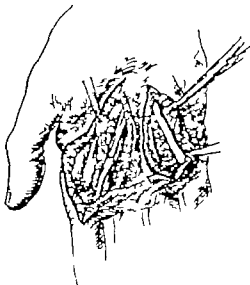


Fig. 363.—The tendons and nerve, freed from adhesions, are surrounded with fat.

but a study of the various forms of treatment after operation. The first part of the question I have discussed with you exhaustively in previous clinics. I believe that you appreciate the fact that no matter what the after treatment may be, these patients will not secure the best possible function unless correct and adequate incisions are made. On the other hand, considerable experience has taught us that if proper incisions are made reasonably early in any type of infection, whether it be a connective-

to produce alternating dilatation and contraction of the blood vessels, and so improve nutrition by improving the muscular tone of the blood-vessels.

Splints.—If the original incision has been so made that there is a tendency for the tendons to prolapse, it is advisable to apply a dorsal splint during the time that the patient's hand is not being exercised. In no case, however, should these splints be applied and left in position for any considerable period. They should be removed at least two or three times a day in order that the procedures mentioned above may be carried out. At times there is a tendency for extension to take place at the metacarpophalangeal joint with flexion at the interphalangeal joints, because of the involvement of the lumbrical muscles and the nerves which supply them in the infectious process, and, second, because of the involvement of the median and ulnar nerves in the forearm. It may be found advisable to apply splints for a short time in order to prevent this contraction, but it is seldom necessary if early passive and active motion has been instituted. The condition we often see of permanent flexion at the wrist joint, particularly if associated with adduction or abduction, is due in my judgment, to the fact that the patient's hands have been bound up for a considerable period of time with dressings, and that no attention has been paid to proper after treatment.

Mechanical Devices in After treatment.—Within ten days or two weeks it will be found that the methods outlined above do not adequately meet the problem in these patients. The patient grows tired of active and passive motion, and the surgeon fails to continue the personal supervision that these patients require. In order to maintain the interest of the patient and to ensure a steady progress toward the restoration of function a number of various mechanical devices have been suggested. Whatever method is used it should be borne in mind that the patient's interest must be aroused so that he will willingly continue the treatment. This may be secured ordinarily by introducing as far as possible the element of competition either with himself or with others.

and abducting them—after which the surgeon may carry out passive motion in various directions. If the infection has been due to the streptococcus it may be advisable to delay active and passive motion for twenty-four hours more. If the patient's temperature should rise after manipulation of the hand, passive and active movements should be delayed for another twenty-four hours, and then carried out very gently and through a limited range of motion. The importance of these movements, however is so great that some risk is justifiable in instituting them. They may ordinarily be done without pain to the patient. If there is pain the forearm and hand may be immersed in a hot bath for ten or fifteen minutes, after which movements can ordinarily be carried out without pain. I cannot insist too strongly upon the necessity of beginning this treatment at the earliest possible moment.

Hot Baths.—After forty-eight or seventy-two hours the arm bath, which is large enough to permit complete immersion of the hand and forearm, may be substituted for the hot dressings used immediately after operation. The entire hand and forearm are kept in the bath for twenty minutes two or three times a day during which time the patient moves his fingers both by active contraction of the muscles and with the help of the other hand. The water is as warm as can be borne without pain. This procedure relieves the pain, keeps the skin thoroughly cleansed, and produces an increased blood-supply which helps to combat the infection and at the same time improves the nutrition of the part.

Dry Heat.—At the end of from four to six days it will be found advisable to decrease the interval during which the hand is immersed, and to expose the infected hand immediately after the bath to the rays of an electric light which will thoroughly dry the skin. Healing of the superficial tissues will take place more rapidly once the infection is under control, if passive congestion is avoided. The warmth of dry heat, just as of moist heat, will help to relieve pain, and make passive and active motion easier. By alternately plunging the hand into baths of hot and cold water for fifteen minutes twice a day it is possible

to a buckle on the flexor surface of the glove at the wrist. By this means the fingers may be flexed to any desired degree, so that the patient can grasp the handle of a tennis racquet, an Indian club or golf club a roller or other hand apparatus. Still later by the aid of this glove the fingers may be flexed so that

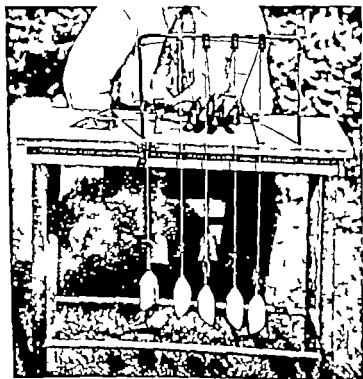


Fig. 365.—Device for exercising the fingers and thumb.

the patient can punch a bag. This is an especially satisfactory form of exercise in the later stages of treatment.

Games and devices that relieve the monotony of routine movements are always helpful. For exercising the fingers, crocheting and practising on the piano or typewriter are particularly valuable. For the fingers and wrist tennis, Indian clubs, hand-

Among the most valuable devices available are the various types of rollers which the patient rotates so as to raise or lower the weights which may be attached. Those constructed of cylinders of varying sizes are the most effective, since the patient is constantly encouraged to flex his fingers about the

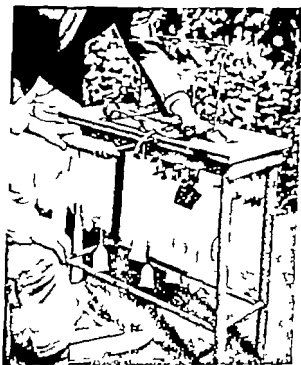


Fig. 364—Mechanical devices for exercising the fingers and wrist

smaller cylinders. Another valuable device is a glove so constructed as to hold the fingers in a position which prevents contraction in an improper position, and which permits the patient to grasp objects of different varieties. Such a glove can be made by attaching a leather strip to the back of each finger of the glove and bringing it forward over the tip of the finger

may require a longer time. It should respond to treatment, however even in neglected cases, so that the patient should eventually have full use of the finger. With regard to the index finger itself the result will vary as to whether the tendon has prolapsed or whether it has been destroyed by infection. If it is not prolapsed and has not been destroyed, almost complete return of function can be secured. With all of these fingers individual function is likely to be slightly impaired because of the formation of adhesions at the point where the deep flexor tendon passes through the superficial tendon. Such adhesions prevent the proper movement of the distal phalanx. This condition can be obviated only by early and adequate incision, followed by prompt and adequate after-treatment.

Involvement of the tendon sheath of the thumb or little finger with consequent involvement of the ulnar and radial bursa and the formation of abscesses in the forearm, would seem to present a much more dubious outlook, but I can assure you from personal experience that the results obtained in this particular type of infection, if incision has been made reasonably early and the methods suggested above followed out, are far beyond what we originally supposed. The first patient whom you saw today had just such an infection and though he came to us at least five days after the tendon sheaths became involved, he has obtained a complete restoration of function. Such a result can be secured in practically every instance, with the possible exception that full extension of the little finger may at times be lost.

THE STAGE OF ADHESIONS AND CONTRACTURES

We come now to that group of patients who have suffered from infections in the hand which have been improperly treated, and who present themselves with stiff claw-like fingers and hands, with ankyloses at the joints of the hands and wrist—in short, with an insensitive and an altogether useless member. The difficulties to be met with at times seem almost insurmountable. The median and ulnar nerves are frequently involved in the suppurative process. Scar-tissue contraction has compressed

ball, golf indoor ball, volley ball, and bowling are helpful. At first it may be necessary to strap the hand about the tennis racquet or golf club with the aid of the glove mentioned above. In cases with marked stiffness of the fingers it is frequently a source of wonderment to the patient that he is able to maintain his hold on the club or racquet, and the assurance thus acquired may be the only stimulus needed to keep him at the game. The surgeon should insist that the patient keep at some form of exercise at least an hour each day dividing the time according to the strength of the part.

The surgeon's interest should not end here. He should remember that the ideal in surgery of the hand is to restore the patient to the occupation to which he is accustomed. The laboring man should be urged early in his treatment to use the shovel, the pick or hoe, or to use the hand in grasping a hammer an axe, or a wheel-barrow. The musician, the stenographer, the type-setter, the mechanic can all find suitable exercises for helping them to acquire the dexterity needed for their particular work. Such exercises should not be carried out in a perfunctory manner but with the active co-operation of the surgeon, who realizes that by their use complete function may be restored to the patient.

With abscesses in the hand which do not involve the tendons it is possible to secure complete restoration of function inside of a month. Where the tendon sheaths have been involved, if delay in the treatment has occurred, a longer period of time is generally necessary. 85 per cent. of function ought to be secured within four months, 95 per cent. within six months and in favorable cases 100 per cent. within a year.

In those patients who have involvement of the tendon sheath of the index-finger it will be found that there is some limitation of motion on the part of the middle finger and ring finger. Impaired function of the ring finger however is generally not due to adhesions about the tendon sheath, and with proper treatment complete function should be restored very quickly. Function of the middle finger may be impaired by involvement of the lumbrical muscle attached to it, so that restoration of function

tion can ordinarily be restored earliest to the fingers adjacent to that most seriously involved that is to say if the middle finger has been involved and there is some limitation of motion in the index and ring fingers, even though complete function may not be restored in the middle finger yet the freeing of adhesions, the transplantation of fat, and other procedures to be mentioned will result in restoring function in the index and ring fingers. Where the thumb and little fingers are involved, and there is also an extensive destruction at the wrist joint, one must be especially careful not to promise marked improvement, because in such cases the muscles and nerves of the hand are extensively involved. Even here at times results far beyond expectations may be obtained. A fibrous ankylosis at the wrist joint may at times be broken up by operation, and with persistent after-treatment a considerable degree of function may be restored. If there is a bony ankylosis it will be necessary to resect at least $\frac{1}{2}$ inch of bone, and replace it with a pedicled transplant of fat to preserve its mobility.

In the complicated cases it is my custom first to free the tendons on the back of the hand and transplant free pads of fat from the abdominal wall underneath and above the tendons, being careful not to destroy the sensory filaments of the nerves where they are found. Immediately after operation I flex the fingers at the metacarpophalangeal joints and extend them at the interphalangeal joints. The hand is kept in this position for three or four days, except for a few minutes twice a day when it is moved freely. Operation on the palmar surface cannot be performed until later and if adhesions about the joints are simply broken up and the fingers permitted to return to their previous condition, ankylosis will again take place in an improper position. After the first operation, because the condition of the flexor tendons is still unchanged, extensive active movements cannot be carried out. It is necessary therefore, at least twice daily to move the fingers through a complete range of movement in every direction—adduction, abduction, and rotation—particularly at the metacarpophalangeal joint.

As soon as the dorsum of the hand is healed sufficiently so

the nerves in the forearm and involved the filaments which go to supply the small muscles of the hand. At times, owing to the fact that the indifferent surgeon has drawn a rubber tube under the anterior annular ligament and left it in place for some days, the median nerve may be found to be entirely destroyed at this site. In the more complicated cases the tendons at the wrist joint will be found to be one indistinguishable mass of scar tissue. Some may be entirely lost, while in others scar tissue contraction and atrophy of the muscle-fibers have taken place. *Not only must the tendons be restored, but the nerve must be permitted to regain their vitality and the muscles must be redeveloped.* If, in addition, the joints of the fingers and the wrist-joint present a bony or fibrous ankylosis the problem becomes still more complicated.

At times considerable improvement may be secured through the breaking up of adhesions in the joints, followed by active and passive motion carried out persistently with the aid of the various appliances mentioned above. This method should be used judiciously and never carried to the extent of tearing the ligaments or tissues. If this accident occurs, new scar tissue is formed, with the result that the patient is in a worse condition than he was at the outset.

Operative treatment should not be attempted unless the surgeon is fully conversant with the anatomy of the hand, particularly with the distribution of the nerves and the relations of the nerves and tendons. It is wise not to promise a patient any benefit from the operation, for while in no case upon which I have operated have I failed to secure a hand better than it was at the time the patient came to me, yet in no case have I restored a hand to a condition equal to that present before the infection occurred. It is better to promise little and do more than to promise much and do less.

Where the index, middle, and ring fingers are involved and the tendons have been preserved, I have been able in some instances to secure good functional results, and in 2 cases I have secured a restoration of function in these fingers when there was also a bony ankylosis at the interphalangeal joints. Func

CLINIC OF DR GATEWOOD

PRESBYTERIAN HOSPITAL

ACUTE DIVERTICULITIS OF THE SIGMOID

Summary: Etiology of diverticulitis of the sigmoid. High mortality renders primary radical operation inadvisable in cases complicated by abscess formation. Technique of operation in present case. After history

THIS patient is thirty-six years old married. I first saw her yesterday when she came to me complaining of acute pain in the abdomen, nausea, and vomiting. Last Sunday or five days ago she ate a hearty dinner and two hours later was seized with severe cramps in the abdomen. A little later she vomited several times. She had been in excellent health before this, although she is habitually constipated. Salts were given and several diarrheal stools resulted. Since the onset the patient has eaten but little and the pain has continued. It has been most marked in the lower left quadrant of the abdomen. In addition to the repeated cramp-like pains which she says resemble gas-pains, there has been a steadily increasing tenderness on the left side, and she thinks she has had considerable fever.

Eight years ago she was operated on for some pelvic condition. According to her brother who is a physician, the left ovary and tube and appendix were removed at this time. She has never been pregnant. Her last period occurred at the usual time, two weeks ago.

Physical examination reveals a well-nourished woman about the age stated who is evidently acutely ill. The physical findings are negative except for the abdomen. Here we find an old scar about 5 inches long evidently the result of a modified McBurney incision. The left rectus is very rigid on palpation, while the right is only slightly so. There is a mass as large as an orange extending medially and upward from the crest of the

that there is no danger of the wound opening at the site of incision—ordinarily within six weeks or two months—the second operation is performed on the flexor surface. This is much more difficult and tedious. The dissection should always begin on the flexor surface of the forearm, the median and ulnar nerves should be identified, and with magnifying glasses these nerves followed down into the hand to their finest ramifications. I cannot emphasize too strongly the necessity of care in dissecting out these nerves, particularly the motor nerve to the short muscles of the thumb, which comes off from the main branch of the median about a thumb's breadth below the anterior annular ligament.

The anterior annular ligament itself may be cut, and from the mass of scar tissue beneath it tendons may be made or new tendons may be constructed from free transplants of fascia.

It is not my purpose to discuss with you the entire subject of treatment in these complicated cases, but I wish to draw your attention to the fact that if the patient is willing to undergo two or three operations, and to carry out treatment for a number of months after operation along the lines which we have suggested the results will surpass one's expectations. Improvement in these cases does not cease at the end of six months or a year but will continue for four or five years, so that the patient should be considered as under your care for at least this latter period of time. He should meanwhile be inducted into work in which he can use his hand, and should be advised and urged to use it.

The apparatus we have used in these cases is simple in construction, as you can see by examining this table. We have taken an ordinary kitchen table and attached to it the forms of apparatus we have found most valuable, so that the patient may have in compact form for use at his own home the various types of apparatus required.

I would urge you to have in mind constantly that it is your duty as surgeons not alone to make proper incisions and evacuate pus, but to see to it that adequate after treatment is carried out persistently and intelligently. The hand of the working man is his most valuable asset. Without it life becomes a burden.

not for the acuteness of the symptoms. Ulcerative colitis and tuberculous colitis hardly need to be mentioned as the acute onset, combined with temperature and leukocytosis indicates some trouble of very recent origin. What have we left? Left sided appendicitis can duplicate the picture we have here, but we are reliably informed that the appendix has been removed. So-called *left-sided appendicitis* or diverticulitis of the sigmoid, has been frequently reported in recent years and fits our case so well we can make that diagnosis without hesitation.

There is no contraindication to a general anesthetic, so that we shall operate under ether anesthesia. I am making a muscle-splitting incision, similar to the McBurney incision in the lower left quadrant of the abdomen (Fig 366 1). I hope to be able to separate the peritoneum from the pelvic wall so that I can drain the abscess, which we are almost sure to find, without opening the peritoneal cavity. I am not at all sure that I can do this because most diverticula of the large intestine develop from the antimesenteric border and therefore rupture into the peritoneal cavity and are secondarily walled off. This is in direct contrast to diverticula of the small bowel which rupture at the mesenteric border between the leaves of the mesentery. In that event it will be necessary to open the peritoneum and proceed as in a case of perforative appendicitis. I find that it is impossible to explore this mass without opening the peritoneum. Upon opening the abdominal cavity the sigmoid almost immediately presents. It is indurated, edematous, and the peritoneal surface has lost its luster (Fig 366 2). As I attempt to explore I open into an abscess cavity between the sigmoid and the pelvic wall. This does not make our diagnosis absolutely certain, but there is little likelihood of any other lesion giving this picture.

What shall we do further? It has been pretty generally agreed that in diverticulitis with abscess formation no radical operation should be contemplated. I shall, therefore simply content myself by draining the abscess and closing the wound after inserting two cigarette drains (Fig 366 3). The probabilities are that this will be sufficient to produce at least a temporary cure. Whether or not it will be permanent will depend

flum. This is exquisitely tender. There is no tenderness in the region of the left kidney and no rigidity of the lumbar muscles on this side.

Vaginal examination reveals a small, infantile uterus well anteverted. There is no mass to be felt on either side and almost no tenderness. The mass on the left side is too high to be palpated through the vagina.

Her temperature since admission has varied from 100° to 102.2° F. Her leukocyte count yesterday was 16,100 and hemoglobin 80 per cent. (Dare). The urine is negative except for some epithelial cells and an occasional leukocyte.

We are evidently dealing with an abscess in the region of the sigmoid and the diagnosis is not difficult. From the vaginal examination and from the history of an old operation, such a pathologic condition as a strangulated ovarian cyst or post-tube can be eliminated. The mass is higher than one would expect for almost any pelvic pathology. Extra-uterine pregnancy has been suggested, but the signs point rather to some acute infection, and there have been no symptoms of hemorrhage. I can remember very well a case of pyonephrosis with a displaced kidney which gave much the same picture as we find here. However in that case there was an antecedent history suggestive either of kidney stone or Dietl's crisis and there was also marked evidence of cystitis. Carcinoma of the sigmoid naturally suggests itself, but I believe we can eliminate it from our consideration. While it is not at all unusual to find malignancy of this portion of the large bowel in a woman of her age we should expect more in the way of a preceding history such as increasing constipation, loss of weight, and blood in the stools. Pain frequently is absent in cancer of the bowel until infection complicates the history so that the absence of preceding pain and tenderness is without much significance. It is often surprising how much obstruction may result from inflammation of very small diverticula, giving symptoms similar to those caused by carcinoma of the large bowel. The x-ray however usually makes the diagnosis definite, except in those cases in which both are present. We should have employed it in this case were it

upon several factors. In the first place in most of these cases multiple diverticula are present, sometimes hundreds of them beginning at the splenic flexure and extending as far down as the rectum. Most of them, however occur in the large bowel, and especially in the sigmoid. In the second place, the ultimate prognosis will depend on whether this diverticulum contains a fecal stone or other foreign body which was extruded at the time of perforation. In the event that no foreign material has been left behind, the patient may be entirely cured. If however some fecolith or other foreign material is retained within the diverticulum one may be sure that further trouble will be encountered until the cause has been removed. In the event we had not found an abscess, but simply an acute inflammation comparable to acute gangrenous appendicitis, we might have considered a radical operation, which would mean that all the diverticulum bearing area should be resected. This operation carries with it considerable mortality because anastomoses in this portion of the bowel not infrequently leak and because technically it is often difficult to make a lateral anastomosis with the rectosigmoid after resecting all the diverticulum-bearing area. In 42 cases in which radical operation was performed at the Mayo Clinic the mortality was 14 per cent. In most of these cases there was a history of several attacks, and should our patient have another attack we should feel justified in resecting the entire diseased portion of the bowel.

Attention was first called to this condition by Graser in 1898 and since then a number of men have reported cases from time to time, probably the largest number having been reported by W J Mayo¹ in 1916. Telling and Gruner in 1917 discussed very fully diverticula of the large intestine, and were able to collect 324 cases from the literature. They concluded that most of the cases are due to acute infection in preformed diverticula, which are usually entirely innocent, the etiologic factor being generally the irritation of some foreign body. Drummond, in

Mayo, W J. Jour Amer Med Assoc., 1917 lxxx, p. 781.

Telling and Gruner: Brit. Jour Surg. 1916-17 vol. 4, p. 468.

Drummond Ibid., 1916-17 vol. 4, p. 407.

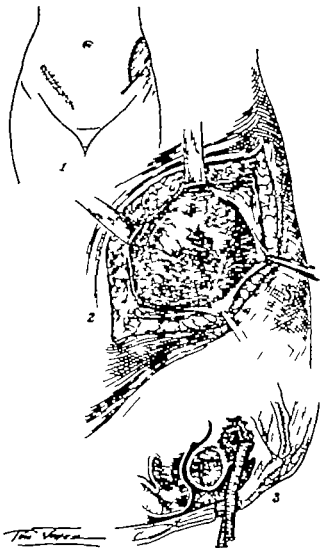


Fig. 366.—Acute diverticulitis of the sigmoid. 1, Muscle-splitting incision in lower left quadrant of the abdomen. 2, Indurated and adenomatous sigmoid protruding. 3, Abscess cavity between the sigmoid and pelvic wall. 4, Two cigarette drains inserted down to abscess.

Intestine is an inherent weakness of the bowel wall. It has been definitely shown that these diverticula occur between the mesenteric and lateral longitudinal muscular bands, usually at the site of the perforation of the blood vessels (Fig. 367). Such sacculi may number from one to several hundred. They are not confined solely to the large bowel, as similar pouches have been described in the esophagus and, in fact, throughout the gastrointestinal tract. However they are usually symptomless unless some foreign body causes irritation, and many cases come to autopsy before the presence of diverticula is suspected.

Postoperative Note.—The cigarette drains were removed at the end of five days and two small soft-rubber tubes inserted in their stead. Drainage continued for about three weeks and finally ceased. A report received two months after operation states that she has had no recurrence of the symptoms and, to all appearance, is entirely well.

reporting his investigations concerning the cause of diverticula, states that he believes the term "diverticulum" should not be used at all, but should be reserved for such congenital conditions as Meckel's diverticulum, and suggests the term "saccul." He

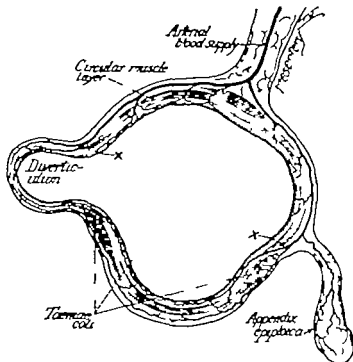


Fig. 367—Schematic drawing showing usual location of diverticula. Note that the longitudinal muscle band at mesenteric border prevents the formation of diverticula as found in the small bowel. The weakest points (x) are just lateral to the longitudinal bands where the blood-vessels perforate the circular muscle layer.

believes that all such pouches are acquired. Klebs emphasizes the fact that these diverticula or sacculi occur in fat people. Drummond believes they are more apt to occur in people who have been fat and have lost considerable weight. The most important factor however in the production of diverticula of the large

CLINIC OF DR. GEORGE E. SHAMBAUGH

PREBYTERIAN HOSPITAL

ACUTE PERICHONDritis OF THE EPIGLOTTIS

Summary: Acute perichondritis of the epiglottis a rare lesion. Sudden onset in present case. Recovery without radical surgical intervention.

THE patient is a woman, age forty five who consulted me in March, 1920 complaining of a severe sore throat and great difficulty in swallowing. The trouble had developed four days previous with a chill, profound systemic depression, and a temperature of 102° F. Previous to the onset she had been in perfect health and we were able to discover no local or general cause for the trouble. For three days she experienced difficulty in breathing. This had disappeared when I saw her but she still experienced extreme pain on swallowing, which she described as the sensation of a fish bone sticking in her throat. At no time had there been any hoarseness.

The patient looked extremely anxious and was very much exhausted. An examination disclosed nothing abnormal in either the oropharynx or hypopharynx. By means of the laryngeal mirror the vocal cords were seen to be quite normal, as was the whole of the interior of the larynx. The epiglottis alone was very much swollen. The laryngeal aspect was, however quite smooth and appeared quite normal. The swelling was confined to the lingual side and completely filled the space between the root of the tongue. On this aspect of the epiglottis, which was generally swollen, could be seen a more or less circumscribed elevation, perhaps $\frac{1}{2}$ inch in diameter. The patient stated that two days previous she had experienced a sensation of something breaking followed by the discharge of a quantity of bloody pus and since then she still experienced from time to

ACUTE SPHENOID SINUITIS

Summary: Sudden onset of infection of the sphenoid sinus during convalescence from the "flu." Transillumination and radiographic examination of no particular value in the diagnosis of sphenoid sinus trouble.

THE patient is a man forty-seven years old who consulted me January 30 1920 complaining of a profuse discharge from the right side of the nose associated with a severe occipital headache. The trouble had developed rapidly while recovering from an acute infection which had been diagnosed as the "flu." The head symptoms had begun with a feeling of fulness between the eyes, soon followed by an excruciating headache extending from ear to ear but somewhat more severe on the right side. The headache was more severe when attempting to walk. The jarring seemed to make the pain unbearable. Before twenty-four hours had passed he began to notice a profuse discharge from the right side of the nose. The most severe pain developed on the third day after the onset of the trouble. The pain was always made worse by sitting upright, and he found the most relief by lying on the left side with the head hanging somewhat over the edge of the pillow face downward. When the pain was at its height he experienced more or less annoyance from vertigo which disappeared as the pain subsided.

An examination disclosed nothing abnormal in the left side of the nose. The right nasal chamber was bathed with thick mucopurulent secretion and it was necessary to cleanse the nose completely before the source of the secretion could be discovered. It was then seen that this did not appear in the middle meatus, that is, under the middle turbanated body as it does when the antrum or the frontal sinus is involved. The secretion was seen to be oozing out from the space between the middle turbanated body and the septum, and the flow was increased by tipping the head forward. It was possible to pass a probe into a rather large sphenoid sinus. For this purpose a probe was used with

time the taste of pus. Two days later the swelling of the epiglottis had somewhat subsided, but pus was still seen oozing from the angle between the epiglottis and the root of the tongue. After another two days the pus had disappeared, but the epiglottis was still fully $\frac{1}{2}$ inch in diameter. From this time on the condition rapidly subsided and after a week no trace of the trouble could be discovered.

The case appears to be one of perichondritis of the epiglottis, an extremely rare condition except as it develops in the course of laryngeal tuberculosis. Fortunately the condition was limited to the lingual aspect. Had the process extended to the laryngeal side, the edema might readily have produced a serious condition by extending to the loose tissue within the larynx, causing the so-called edema of the glottis. As it was, the patient suffered some difficulty in breathing when the swelling was most pronounced, pushing the epiglottis over the larynx. It seems possible that the condition seen in this case might have been produced by a fish bone lodging in the lingual side of the epiglottis. The patient, however, gave no history of having eaten fish previous to the onset of this trouble. The symptoms which developed in this case, the chill, the elevation of temperature, and the marked systemic depression are quite characteristic of an acute perichondritis such as we see developing occasionally in the septum of the nose after traumatism.

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the point curved slightly downward, the bend being about $\frac{1}{2}$ inch from the tip. When this probe was passed into the sphenoid sinus it was found to extend 9 cm. from the anterior inferior nasal spine.

The transillumination test readily excluded both maxillary and frontal sinuses as foci of infection, for in applying this test both frontal and maxillary sinuses appeared quite clear. It is quite possible in the vast majority of cases to determine definitely the absence of a frontal or maxillary sinus disease by means of the transillumination test, for when the light comes through quite clearly one can be sure that these sinuses are not involved. This of course, presupposes that the examiner has had experience in interpreting the results of this test. It is particularly in the cases where the transillumination gives an indefinite result that a definite diagnosis requires other methods of examination. Where the transillumination fails to show that the sinuses are clear this cloudiness may be due to anatomic variations as well as to pathologic conditions within the sinus. In order to clear up the diagnosis where the frontal sinus is in question the skiagraph gives the best results. It will show at once when the cloudiness on transillumination is due to a small sinus or what is not uncommon, a complete absence of this cell. The skiagraph gives the exact outlines of the upper margin of the frontal sinus and shows very distinctly when the sinus is filled with secretion.

As regards the maxillary sinus, the skiagraph is of less value, and usually adds little to the results of the transillumination tests. It is particularly in cases where, due to thick bone the transillumination test gives a shadow that the skiagraph will show a clear sinus. We have a simple method of determining the conditions within the maxillary sinus. This is by puncture of the nasal wall and irrigation. Where the anatomic relations permit, the simplest procedure is to make the puncture through the middle meatus, that is, above the attachment of the inferior turbinated body. In order to do this readily it is necessary to introduce the trocar under the free edge of the middle turbinated body. Otherwise one is forced to make a puncture too close to the upper border of the lower turbinated body where

the bone is quite firm. The Killian trocar is the best instrument for puncturing through the middle meatus. Very often this instrument can be introduced through the normal opening. It is always important in puncturing this wall of the antrum to direct the point of the trocar downward as well as outward. This is done in order to avoid as far as possible the danger of puncturing the orbit. Caution must be taken, too, in starting the irrigation. The development of pain in the orbit is the signal to desist. When the puncture through the middle meatus cannot readily be carried out, it is always possible to make the puncture through the inferior meatus, that is, under the lower turbinated body. For this purpose a straight trocar is used, the point being introduced well up near the attachment of the lower turbinal.

For diagnosing sphenoid sinus trouble transillumination can be of no assistance, and the skiagraph is of less value than in either the frontal or maxillary sinuses. Fortunately the sphenoid sinus is not inaccessible for an intranasal examination. Even the operation for draining the sphenoid sinus can be carried out with less difficulty than the intranasal drainage of the frontal sinus. In the case here reported it was not found necessary to operate since the drainage from the normal opening was not impaired. The acute process disappeared in little more than one week.

The most distinct symptom in this case was the severe occipital headache. I have seen this type of headache in other cases of sphenoid sinus disease and have come to consider it rather characteristic of infection in this sinus. The headache associated with disease of the frontal and maxillary sinuses is the typical frontal type restricted to the affected side. The diffuse frontal headache involving both sides, or where it is centered about the root of the nose, is not characteristic of frontal sinuitis. On the other hand, one-sided frontal headache is found in cases of acute maxillary sinuitis where the frontal sinus is not involved.

PRIMARY SYPHILITIC SORE ON THE FAUCIAL TONSIL

Serology: Demonstration of *Spirocheta pallida* in the exudate from tonsil.
Chancres about the buccal cavity not an uncommon occurrence.

THIS case was a man twenty-seven years old who consulted me in May 1920 complaining of a sore throat of three weeks duration involving the left side and associated with cervical adenitis under the angle of the jaw on that side. The sore throat was not especially troublesome, in fact, was scarcely noticed except on swallowing. The case had been suspected for diphtheria, and two cultures had been made, but both were negative. The affected tonsil had been treated both with iodine and silver nitrate, but without any appreciable effect.

On examination the right tonsil was found quite normal, but the left tonsil was swollen, inflamed, with the exposed surface covered by a dirty looking exudate. The appearance at once suggested the primary sore of syphilis, although it might have been caused by diphtheria. The duration of the trouble, the absence of severe local or general symptoms, and the marked involvement of the cervical lymphatics all pointed to syphilis as the probable cause of the trouble. The case was referred to Dr Ormsby who reports the demonstration of *Spirocheta pallida* from the exudate over the tonsil.

This is the third case of chancre of the tonsil that I have seen. The clinical picture was the same in all three. It was only in the first case observed that I remained in doubt about the diagnosis after examining the throat. This case was seen during the first year that I was in practice, and long before the diagnosis by discovery of the spirochete was known. It did not occur to me at first that the patient could have a primary sore on the tonsil. After watching the case for a couple of weeks and noting the enormous swelling of the cervical lymphatics I decided to amputate the infected tonsil by the method then in vogue for operating on this structure. With the Mathieu

tonsillotomy the diseased tonsil was amputated and examined histologically. I was expecting to find evidences of a tubercular process. This, however, was not found, and shortly after the patient developed the symptoms characteristic of secondary syphilis. In this case the patient stated that the trouble had developed as a typical attack of acute tonsillitis to which he had long been subject, only this time the tonsil failed to heal. He was working in a shop with a man taking treatment for active syphilis and both had been using the same drinking-cup.

The occurrence of chancre about the buccal cavity is not so uncommon, the lesion being usually located on the lips. In one case I diagnosed a chancre on the tongue of a young woman. It was located on the dorsal surface about $\frac{1}{2}$ inch from the tip.

SUPPURATION OF THE LABYRINTH FOLLOWED BY INTRACRANIAL COMPLICATIONS

Summary: Cholesteatoma in the middle ear producing fistula into the labyrinth. Fatal termination from intracranial complications.

THE case was that of a man twenty-seven years old who consulted me in February 1920. His complaint was annoyance from vertigo which had been present off and on for a couple of weeks. He gave a history of suppurating ears following scarlet fever at the age of five. The left ear had long since ceased discharging, but the right ear had continued to discharge. Since the onset of the vertigo he noticed that any quick movement of the head brought on sensations of dizziness.

On examination, the left ear was found dry, the perforation of the drum membrane being closed by a scar. In the right ear there was a marginal perforation occupying the upper posterior quadrant. Through the perforation one could readily discern the whitish flakes characteristic of a cholesteatoma formation. There was a small amount of foul-smelling secretion in the fundus of the canal. The penetrating odor was so characteristic of a cholesteatoma that one could almost make a diagnosis from that alone. The perforation in the upper posterior quadrant producing an erosion of the bony margin is the type of perforation which is always associated with a cholesteatoma. Such marginal perforations are not necessarily located in the upper posterior quadrant, although this is the most frequent site. The same type of perforation is often found in Shrapnell's membrane. The formation of a cholesteatoma results from an invasion of the middle ear by epidermis from the external meatus. In order for such an invasion to take place it is necessary first of all that the ear be the seat of a chronic suppurative otitis media, and in the second place the perforation must be a marginal one, for the reason that the invasion of epidermis can only take place where the path is over a more or less smooth field. A central

perforation in the drum membrane does not provide this latter condition. A chronic suppurative otitis media, therefore, in which the perforation is central, that is, when it does not involve the margin, no matter what its size, is never complicated by a cholesteatoma formation. There is one exception to this rule, when in the presence of a large central perforation the handle of the hammer has become adherent to the inner wall of the tympanic cavity. Under these circumstances the smooth surface suitable for the invasion of epidermis is provided. In such cases one occasionally sees the development of a cholesteatoma. What happens in the cholesteatomatous process is somewhat as follows. The epidermis, having greater vitality than the mucous membrane when transplanted to the tympanum, supplants the latter. The epidermis now lining the middle-ear cavities, the aditus and antrum, as well as the tympanum, is subjected to conditions of moisture and absence of air which cause exfoliation. This process keeps up until the middle-ear cavities are filled by a mass made up of concentric layers like those of an onion. On the interior of this mass decomposition takes place with the formation of cholesterol crystals, hence the name, cholesteatoma. The constantly increasing size of the cholesteatomatous mass produces a gradual absorption of the surrounding bony wall in spite of nature's effort to check the progress by a process of osteosclerosis. The result is that the process eventually erodes through the tympanic bone, producing a perforation into the middle-brain fossa, the lateral sinus, or into the labyrinth. The labyrinth fistula thus produced is usually found in that part of the horizontal semicircular canal forming the floor of the aditus ad antrum. Only rarely does it produce a fistula in the superior canal.

A further examination of this case disclosed the fact that the patient had not only a cholesteatoma in the middle ear but that this had actually produced a fistula into the labyrinth. This was demonstrated by making alternating compression and suction of air in the external meatus. On compression there developed a nystagmus with the quick component directed toward one side, and on suction a reverse nystagmus, that is, with the

quick component directed toward the opposite side. By means of caloric stimulation, which in this case was carried out by injecting a steady stream of compressed air into the external meatus, it was possible to elicit a slight response in the form of a rotary nystagmus with the quick component directed toward the opposite side. A functional examination of the hearing found the right ear practically normal, but apparently no remnant of hearing in the left.

The patient was sent to the hospital where he could be more carefully watched. For about a week there was no apparent change in his symptoms except that all evidence of function disappeared from the labyrinth. During this time the patient insisted that he was feeling very well, largely because he had ceased to have any active vertigo. There were two ominous symptoms, however which persisted. One was the continuation of a slight temperature, rarely going above 99° F. Associated with this there was more or less annoyance from a slight but persistent headache. I became very anxious, fearing an extension of infection from the labyrinth to the cerebellar cavity but the patient could not be persuaded that he was ill enough to require an operation. It was clear to me that in the presence of a cholesteatoma producing a fistula into the labyrinth, which, in turn, had led to a diffuse labyrinthitis and a complete destruction of labyrinth function, that the proper course was to resort to a radical mastoid operation and the establishment of free drainage from the labyrinth. The latter is accomplished by opening the vestibule, chiseling away the lower border of the oval window and by making an opening into the vestibule behind the facial ridge. This is done by chiseling into the horizontal canal where this lies exposed in the floor of the aditus, and then following the canal forward until an opening is made into the vestibule.

At the end of a week the patient instead of improving was growing somewhat worse, and for the first time began to develop a slight spontaneous nystagmus with the quick component directed toward the same side. This symptom developing in the wake of a diffuse destructive labyrinthitis, points unmis-

takably to the occurrence of a cerebellar complication. I impressed on the patient the necessity of an immediate operation. He reluctantly consented to an operation the next day provided he was not better. That night he became very restless and about midnight became unconscious. In less than two hours he was dead. It was not possible to secure an autopsy.

This case illustrates very clearly the danger when a suppurative disease of the middle ear extends to the labyrinth. So long as the labyrinth involvement remains circumscribed, that is, so long as it is possible to demonstrate the fistula symptom, there is no danger of an intracranial complication developing. When, however, the inflammation in the labyrinth develops into a diffuse labyrinthitis, destroying the function of both the hearing and of the semicircular canals, then a condition exists which frequently leads to a fatal intracranial complication. This is especially true in cases of chronic suppurative otitis media where there exists in the middle ear a condition like a cholesteatoma that requires a radical mastoid operation. The radical operation with the drainage of the labyrinth is all the more urgent when, as in this case, there persists an elevation of temperature with headache. When one waits until the development of definite symptoms of an intracranial complication the operation, as a rule, will be too late to save the patient.

CHRONIC SUPPURATIVE OTITIS MEDIA WITH CHOLESTEATOMA

Summary: Bilateral cholesteatoma following chronic suppurative otitis media. Radical mastoid operation on one side with no impairment of hearing.

THE patient, a man aged twenty-six, consulted me in January 1920 complaining of an annoying headache, and a chronic discharge from the left ear which had persisted since childhood.

The examination disclosed the fact that the chronic suppuration was bilateral, although the discharge was more marked from the right ear. There existed a marginal perforation located in the upper posterior quadrant of both drum membranes. In both ears granulations were protruding more marked in the left ear through the perforation. There was some evidence of an offensive odor to the discharge. The functional tests showed that the hearing was about equally reduced in both ears, the whispered voice being heard at about 2 meters. It seemed probable that we had to deal with a form of chronic suppuration in both ears that might require a radical mastoid operation.

My first effort was to destroy these granulations in order to determine more accurately the character of the middle-ear disease. Should the process prove to be complicated by caries or a cholesteatoma, a radical operation would be called for. On the other hand, should it appear that the disease was restricted to the mucous membrane of the middle ear that is, if there was no involvement of the underlying bone, the radical mastoid operation would not be necessary since this type of disease does not lead to serious complications. The protruding granulations in the right ear were cauterized with a bead of silver nitrate. When they were sufficiently shrunken it was possible to demonstrate the whitish flakes characteristic of cholesteatoma. The patient was then advised to submit to a mastoid operation. This was urged all the more strongly because of the persisting headache,

which is always a more or less ominous symptom in cases of chronic suppurative where the examination discloses a bone-invading process.

It was decided to overlook the less active process in the left ear although I suspected a similar cholesteatomatous process on that side. The object in handling the two sides separately was this. In performing the radical mastoid operation one can never be sure that there may not result a more or less marked depression of the hearing after healing has taken place. It is always preferable, therefore, when undertaking this operation to attack one side at a time, selecting the side in which the disease is the more active. Should it happen that the end-result after the operation is a marked decrease in the hearing on that side, no operation should be undertaken on the opposite ear unless the process in that ear becomes more active, and especially where it gives rise to symptoms suggesting a possible intracranial extension. The reason for this conservative position is quite apparent. A patient will always prefer to take some risk from a possible complication rather than take the chance of losing the one hearing ear. On the other hand, should symptoms develop threatening the life of the patient, one is quite justified in taking some risk of increasing the deafness by resorting to an operation. This point is too often overlooked and patients are subjected to a double mastoid operation at one time. I have seen several such cases where, as a result of such procedure, patients have been left practically deaf for life, when they would have preferred taking some chance of a possible complication rather than to have lost their hearing.

In this patient the radical mastoid was performed on the right side. The result showed no appreciable change in the hearing, and I felt justified in recommending the operation for the opposite side, in which further observation had demonstrated the presence of a cholesteatoma. The patient, however has not as yet consented to the second operation.

CLINIC OF DR. ALBERT J. OCHSNER

ANTONYANA HOSPITAL

CARCINOMA OF THE PANCREAS

Summary: Anastomosis between the gall-bladder and duodenum for relief of common duct obstruction due to carcinoma of the pancreas.

We have for operation this morning a patient presenting an interesting and rather unusual condition. She is a woman fifty three years old, who up to six weeks ago had been in very good health. At this time she had a feeling of fulness in the epigastrium which was relieved by vomiting. Immediately after this she became jaundiced. The jaundice continued to increase until a few days ago when, the patient thinks, the color faded slightly. At intervals since the onset of the jaundice the stools have been clay colored and the urine has contained blood. She has also occasionally had nosebleed. She complains, too, of severe itching of the skin.

On examination we find the sclerae deeply icteric, showing a lemon color rather than a simple icterus. In the epigastrium there is a perceptible and palpable fulness or bulging which is of firm consistency and painless to pressure. This mass moves downward slightly on deep inspiration. The tumor occupies the right hypochondrium and midepigastrie zones. The liver is intimately connected with the tumor mass and extends downward below the right costal arch for a distance of 4 cm.

Examination of the urine is negative except for the presence of bile, as are also the Wassermann test and the blood.

We have made a diagnosis of obstruction of the common duct due to a malignant growth involving the pancreas.

The patient has been thoroughly anesthetized with ether by the drop method, having received a hypodermic injection of

$\frac{1}{2}$ gr of morphin and $\frac{1}{16}$ gr of atropin one-half hour before commencing the anesthesia, in order to reduce the latter to a minimum. In many of these cases we have operated under local anesthesia with $\frac{1}{2}$ per cent. novocain. We are making a longitudinal incision in the right rectus abdominis muscle and shall open the peritoneal cavity in the usual way. As the gall-bladder comes into view we note that it is enormously distended. The common duct also is greatly dilated. Palpation reveals an enlarged pancreas of stony hardness which is evidently the cause of the obstruction to the common bile-duct.

It is evident that it will not be possible for the bile to again enter the intestines unless a new communication is established. In order to accomplish this we plan to make an anastomosis between the gall-bladder and the duodenum.

The first step will consist in evacuating the contents of the distended gall-bladder by means of a large trocar (Fig. 368, 1). About 100 c.c. of green mucopurulent bile is removed together with a number of small gall-stones. We will now insert the trocar into the common duct and empty it (Fig. 368, 2). We have removed about 500 c.c. of the same kind of bile that was found in the gall-bladder. The duodenum and common duct are now approximated (Fig. 368, 3) the opening in the common duct enlarged, and interrupted silk Lembert sutures applied between the two. A transverse opening of the same size as that in the common duct is now made in the duodenum and the anastomosis is established between the two by means of Connell sutures (Fig. 369, 4). This row of sutures is covered by a row of interrupted silk Lembert sutures (Fig. 369, 5). We are using silk throughout the operation because of the dissolving effect of the pancreatic juice upon catgut. The edge of the gall-bladder is now attached to the peritoneum (Fig. 369, 6). This being completed, we are closing the abdominal wound in the usual manner.

We have been able to make this anastomosis without placing the tissues of the common duct and duodenum upon tension. This will favor prompt healing and will produce satisfactory drainage of the common duct.

After-history—A free flow of bile into the intestinal canal

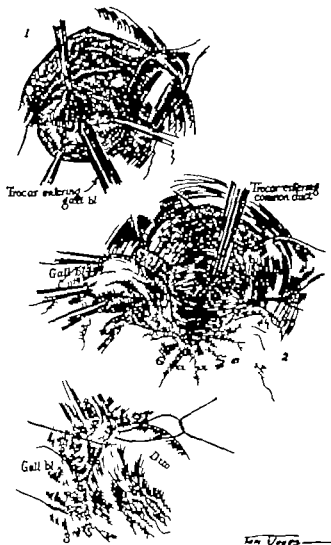


Fig 362.—1 Drainage of the gall-bladder by means of trocar 2, The gall-bladder has been drained, exposing the enormously dilated common duct, which is also being emptied with trocar 3, The common duct opening enlarged and the first row of anastomosing sutures being pulled between the common duct and duodenum.

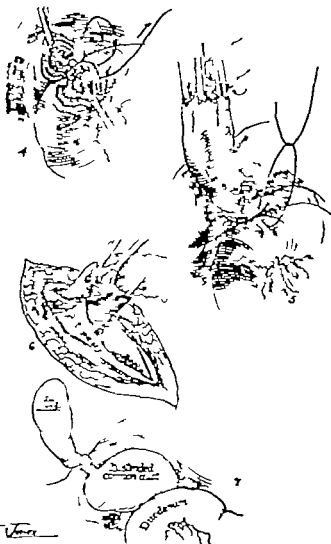


Fig. 369—4, Applying Connell sutures. 3, Completing the anastomosis. 4, Securing the gall-bladder to the peritoneum. 5 Diagrammatic sketch showing the relative size of the common duct.

started almost immediately after the conclusion of the operation, as shown by the color of the feces. The patient's general condition improved very rapidly. She was able to be out of bed two weeks after the operation and returned to her home two weeks later. She continued to gain in strength until the end of three months, at which time the tumor of the pancreas was found to have markedly increased in size and she was beginning to lose strength. No report has been received since that time. There can be no doubt, however, but that the patient was greatly benefited by the operation because of the relief from the itching of the skin, the pressure in the gall-bladder and common duct, and from the hemorrhages which were undoubtedly due to the absorption of bile.

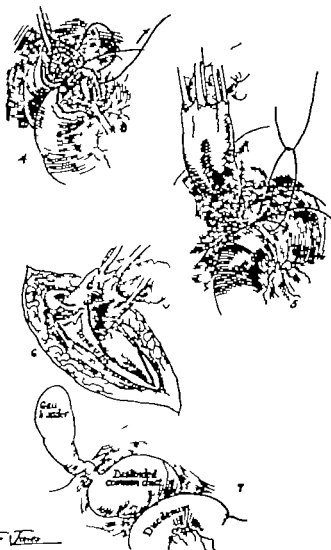


Fig. 309.—4, Applying Connell suture. 5, Completing the anastomosis. 6, Suture the gall-bladder to the peritoneum. 7 Diagrammatic sketch showing the relative size of the common duct.

CLINIC OF DR. CAREY CULBERTSON

COOK COUNTY HOSPITAL

FIBROID OF THE UTERUS

Summary: Cardinal symptoms of fibroid of the uterus. Differential diagnosis. Technique of removal. Whether to perform total or subtotal hysterectomy question to be decided according to the individual case. A new method of peritonization.

THE case for consideration this morning is that of an American negroess, thirty-six years of age who comes into the hospital complaining of pain in both sides of the lower abdomen. The onset of her illness was three months ago and the pain was first located in the midline over the bladder. It was sharp and cramping. She was confined to bed for one week. Since that time she has had a dull aching and at times sharp and cramping pain in both the right and left iliac regions. More recently she has noticed a sacral backache which is constant and at times severe. This pain has not been associated with nausea and vomiting, chills, or fever at any time. The patient has been married twice by occupation is a housewife. Her first marriage took place ten years ago and the second seven months ago. There have been no pregnancies.

Menses began when she was twelve years of age. They have come regularly every twenty-eight days, lasting but two days, with no dysmenorrhea, and moderate in amount. The last period took place nineteen days ago.

On examination this patient is a well-developed, well-nourished woman apparently of the age given. Examination of the head and chest reveals nothing abnormal. The abdomen is flat, soft, elastic, and somewhat thick walled through which a hard mass is palpable just behind the symphysis, rising slightly above the plane of the inlet. This mass is not tender, is movable,

excessive bleeding at the menstrual period (2) dysmenorrhea (3) leukorrhœa, and (4) pain. In this particular case there is no menorrhagia nor any form of uterine hemorrhage there is no dysmenorrhea the patient has not complained of vaginal discharge, nor are there evidences of leukorrhœa. The pain of which she complains is, in all probability due, at least in some measure, to the presence of the tumor. The pain in fibroids of the uterus is of three varieties. First, the pain associated with menstruation second, pain in the tumor itself which is unusual third pain in the surrounding structures, that is, pain due to pressure. A tumor of the size found in this patient's pelvis may well produce pressure symptoms, since it is just large enough to fill the pelvic inlet, being about the size of or slightly larger than, a fetal head. The possibility that the appendages may be at fault and therefore the cause of the pain must not be lost sight of in this case. Palpating laterally on either side through the vagina we make out a prolapse of the appendages, which are not tender but show some thickening. This thickening may be nothing more or less than varicose veins in the broad ligaments, which, however if they exist, are factors also in the production of pain. On the other hand, this thickening that we feel may represent a bilateral salpingitis, which, if chronic, need not necessarily be tender. It is quite probable that, at the time of the acute onset three months ago there was an active inflammatory reaction in the appendages. It is not uncommon in fibroids to find the appendages involved in adhesions, the tubes being enlarged, closed and distended forming the well-recognized hydrosalpinx. It is thought that this change is very often accomplished as a result of nothing more or less than pressure due to the peritoneal surfaces rubbing together until the fimbriated extremities of the tubes become closed or buried in adhesions, after which the tubes distend with serum. On the other hand, the tubes may be directly involved in a suppurative salpingitis, the result, as a rule, of gonorrheal infection. It is not at all uncommon to find a pyosalpinx associated with fibroids of the uterus. The ovaries likewise are subject to changes which are thought to be due again to pressure or at least to congestion of

symmetric, and even. Palpation on either side of this mass elicits some tenderness, causing the patient to contract the muscles in both iliac regions. The vaginal introitus is narrow the vagina is short and distensible. The cervix, which is up and forward, is conical, free, and closed. The corpus is retroflected, the fundus apparently lying in the cul-de-sac of Douglas, while the upper pelvis is occupied by a hard, slightly movable mass in the midline, which is identical or continuous with the mass palpated through the abdomen. This mass likewise is smooth and even. The appendages are apparently prolapsed and somewhat thickened. On neither side, however is tenderness elicited by vaginal palpation.

Examination of the patient's blood shows 14 100 leukocytes and 95 per cent. hemoglobin. Blood-pressure is 120 systolic and 75 diastolic. The urine is negative except for the fact that it shows a few leukocytes. The temperature is normal.

The patient has also complained of frequency of urination for the past three months. For this reason, as well as for the fact of a pelvic tumor existing with possible involvement of the bladder cystoscopic examination was performed one week ago. This showed an edematous mucosa over the trigone and a small extravasation of blood along the right ureteral orifice. Ureteral catheterization was not complete.

The urinary bladder is disturbed to a greater or less extent in most large fibromata. Tumors of the cervix more often produce retention, while those of the corpus, especially of the anterior uterine wall, cause irritability. Where the bladder is drawn up into the abdomen urinary frequency is the rule. Further where tumors in the pelvic situation become impacted, pressure on the ureters results in ureteral dilatation, hydronephrosis, and even pyelitis, with ensuing infection.

Our diagnosis in this case is that of a fibroid tumor of the uterus with retroflexion of the uterus and prolapse of the appendages. This case demonstrates very well a not infrequent observation in uterine fibromata, *i. e.*, an absence of some of the cardinal symptoms of this disease. The cardinal symptoms of fibroids are (1) Uterine hemorrhage, usually characterized by

excessive bleeding at the menstrual period (2) dysmenorrhoea (3) leukorrhoea, and (4) pain. In this particular case there is no menorrhagia nor any form of uterine hemorrhage there is no dysmenorrhoea the patient has not complained of vaginal discharge, nor are there evidences of leukorrhoea. The pain of which she complains is, in all probability due, at least in some measure, to the presence of the tumor. The pain in fibroids of the uterus is of three varieties. First, the pain associated with menstruation second, pain in the tumor itself, which is unusual third pain in the surrounding structures, that is, pain due to pressure. A tumor of the size found in this patient's pelvis may well produce pressure symptoms, since it is just large enough to fill the pelvic inlet, being about the size of or slightly larger than, a fetal head. The possibility that the appendages may be at fault and therefore the cause of the pain must not be lost sight of in this case. Palpating laterally on either side through the vagina we make out a prolapse of the appendages which are not tender but show some thickening. This thickening may be nothing more or less than varicose veins in the broad ligaments, which, however if they exist, are factors also in the production of pain. On the other hand, this thickening that we feel may represent a bilateral salpingitis, which, if chronic, need not necessarily be tender. It is quite probable that, at the time of the acute onset three months ago there was an active inflammatory reaction in the appendages. It is not uncommon in fibroids to find the appendages involved in adhesions, the tubes being enlarged, closed and distended, forming the well-recognized hydrosalpinx. It is thought that this change is very often accomplished as a result of nothing more or less than pressure due to the peritoneal surfaces rubbing together until the fimbriated extremities of the tubes become closed or buried in adhesions, after which the tubes distend with serum. On the other hand, the tubes may be directly involved in a suppurative salpingitis, the result, as a rule, of gonorrhoeal infection. It is not at all uncommon to find a pyosalpinx associated with fibroids of the uterus. The ovaries likewise are subject to changes which are thought to be due again to pressure or at least to congestion of

the pelvic blood-vessels. These changes are usually those described as fibrocystic degeneration, with or without hypertrophy of the organ. The ovary is enlarged, tense, and contains multiple small cysts. Occasionally too in tumors of this size particularly the ovaries are found to be flattened out against the pelvic wall, as if they had been rolled out by a rolling-pin.

The question of leukocytosis brings up an interesting point. A leukocytosis of 14,100 while not a marked reaction, at the same time is distinctly above normal and of some significance. It suggests, first of all, the probability of some chronic pelvic peritonitic reaction, such as would accompany a chronic salpingitis. It also suggests the possibility of a degenerative process involving the tumor itself either actual suppuration or necrobiosis. Necrobiosis in a fibroid is not so infrequent as is thought, and where it is extensive it is very apt to be expressed by some increase in the white blood-cells. Suppuration, on the other hand, is particularly apt to be accompanied by a low-grade fever the temperature ranging from 99° to 100° F together with loss of appetite, headache, malaise etc.

While accepting the diagnosis of uterine fibroid, which was made in this case on entrance into the hospital, we must not leave out of consideration the other conditions which might obtain. In the differential diagnosis of abdominal and pelvic tumors it is always best if we will consider tumors with respect to the abdominal situation separately from those in the pelvic situation. In this particular case the tumor does not rise into the abdomen and, therefore, we do not need to consider those conditions which might obtain higher up. The differential diagnosis in this case, therefore, resolves itself into a consideration of pathologic conditions in the pelvic situation only.

In the first place, we must never leave out of mind pregnancy. We have here a swelling which is smooth, even, symmetric, free and not tender rising slightly above the plane of the inlet, in other words, about as high as a four or four-and-a-half month pregnancy. The tumor is, however hard and board-like, and there are none of the presumptive signs of pregnancy associated with it, that is to say there is no cyanosis of the

vaginal introitus or softening of the cervix either at the external os or through the cervical canal. There is no amenorrhea or other subjective evidences of early pregnancy such as changes in the breasts, morning sickness, etc. On the other hand, there is a history of sterility of long standing. Nevertheless, before accepting the diagnosis of fibroid we must not forget that fibroids and pregnancy appear together.

Interstitial pregnancy and ectopic pregnancy particularly tubal, must be considered. Here, again, we should have some of the presumptive signs of pregnancy and the swelling would be unilateral rather than in the midline and would be of softer consistency probably by this time associated with much greater pain than this patient has experienced, if indeed, not shock and collapse.

Pelvic hematocoele, the result of a ruptured ectopic pregnancy should be readily differentiated from fibroma. As a rule, however hematocoele lies lower in the pelvis, bulging down on one side or the other or filling up the posterior culdesac. It is more apt to require differentiation from pelvic abscess than from uterine fibroid, though I have seen 2 cases of ruptured ectopic pregnancy that very closely suggested a fibroid tumor of the uterus.

Tumors of the ovary particularly hard tumors, are not easy to differentiate from uterine fibroids. Ovarian fibroma, carcinoma, or sarcoma develops into a tumor very much the same as this one in consistency but it should be more unilateral and is more apt to rise higher in the abdomen.

Of the cysts, a dermoid is most apt to resemble fibroid and with a long pedicle may swing over into the midline or into the opposite side of the pelvis, simulating very closely a subserous uterine tumor. Or a simple cyst with twisted pedicle and intracystic hemorrhage will on occasion produce a tumor quite as hard as this one, and with a history of acute pain, at that.

Ovarian cysts, particularly when they are tense and palpated through as thick an abdominal wall as this patient possesses, or when they are heavy and multilocular as in the pseudomucinous variety may very readily be mistaken for a fibroid growth.

Hydrosalpinx and pyosalpinx have been mistaken also for

fibroid tumors of the uterus. Theoretically they do not form such large masses as this. They are apt to be lower down in the pelvis and associated with fixation and tenderness, which we do not have here. We have, however seen in this clinic such swellings of the tubes quite as large as a fetal head, embedded in the pelvis or indeed, rising in the lower abdomen and again closely resembling uterine fibromata.

Large sacrospinous is also occasionally associated with fibroids of the uterus. Tumors of the tubes need hardly be considered here, since, while they occur they are extremely rare and seldom large.

Other rare conditions which need only be mentioned by way of concluding the remarks on differential diagnosis are ectopic situations of the kidney and of the spleen. These organs, it is well known, may descend into the pelvis, and when such is the case have been mistaken for fibroid tumors of the uterus.

The patient having been prepared for operation, we will now proceed with the opening of the abdomen. With the peritoneal cavity opened and the patient in the Trendelenburg position we find the pelvic inlet occupied by a single fibroid mass about 12 cm. in diameter rising from the anterior wall of the uterus. It is perfectly free. The uterus beneath it is retroflexed, the fundus lying in the pouch of Douglas. Both appendages are prolapsed and adherent on either side to the posterior broad ligament and to the pelvic walls. The tubes are kinked, clubbed, closed, and thickened to the size of one's finger. The right ovary is fibrocystic and hemorrhagic and is possibly slightly enlarged. The left ovary is likewise involved, but to a lesser degree. The posterior wall of the uterus is adherent to the rectum from the fundus down to the uterosacral ligaments. The sigmoid flexure is adherent to the left infundibulopelvic ligament. The bladder has been elevated into the abdomen by the tumor growing beneath it. In the right infundibulopelvic and ovarian ligaments is found an extensive varicose condition of the veins which is not present on the left side. The tumor is apparently a single fibroid mass, with no smaller nodules growing from it. So far as can be seen the mass involves

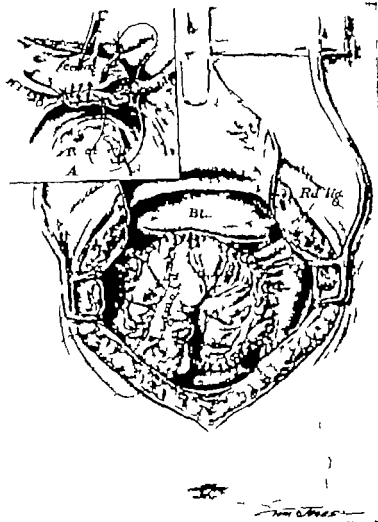


Fig. 370.—Sigmoidorectal peritonization of the pelvis after subtotal hysterectomy completed. A Round ligaments being sutured into cervical stump as the first step in this method of peritonization.

the entire uterine wall. The tumor is subserous but sessile rather than pedunculated. We will therefore extirpate it by

by terectomy instead of by myomectomy taking out at the same time both tubes. In doing hysterectomy it is our custom to remove the tubes with the uterus. In this case salpingectomy is actually indicated, the tubes being involved in a chronic inflammatory process.

The upper pole of the tumor is grasped with two volsella and held as far to the right side as possible. The left tube is then grasped by a clamp at its free end and a ligature is placed between it and the ovary and tied. That portion of the tube grasped in the clamp is now cut away from the infundibulopelvic ligament. Next, a ligature is placed between the round ligament and the tube as close to the uterine wall as possible and is brought out again through the broad ligament close to the previous ligature. This is for the purpose not only of ligating the anastomosing branches of the uterine and ovarian vessels, but of keeping together the left broad ligament which we may desire later to use for purposes of peritonization. This second ligature makes it possible to cut the tube away from its attachment as far as the uterine horn. The next ligature includes the round ligament, and this, in turn, is cut away from the uterus. In order to prevent bleeding through from the other side we will now start from the right side in exactly the same way though clamps may be placed on the uterine side of the wound in order to control collateral circulation. The right ovary is considerably more enlarged and more cystic than the left, but it has not been badly lacerated in freeing it from its bed of adhesions and it has not been so involved as to disturb its function. There is no particular reason why it need be extirpated. I am a strong advocate of conservation of ovarian tissue, and I practically limit the indication for oophorectomy to two processes first, abscess formation, and second, neoplastic growth. Moreover if it is advisable to leave one ovary in a woman thirty-six years of age, there is no reason why two should not be left. Therefore neither ovary will be removed, notwithstanding the degree of abnormality that has been described.

The tissues have been ligated as before and the right tube and round ligament having been cut away and the tumor drawn

well to the opposite side, the base of the broad ligament is sought for the uterine artery. This is grasped with very little other tissue and a ligature passed carefully beneath it, close against the uterine wall. This ligature is tied, the uterine side is grasped with a clamp and the broad ligament is severed as far as the point where the vesical peritoneum is reflected from the uterus. This is cut across from side to side with scissors high up so that a generous peritoneal flap is preserved. In this way there is less danger of impairing the integrity of the bladder wall as it is reflected from the cervix. In reflecting the vesical peritoneal flap from the cervix it is necessary to cut with the scissors through the middle portion of it where there is a broad vesico-uterine ligament. Laterally however it pushes away very readily with the finger wrapped in gauze. One or two more ligatures on either side are sufficient to permit the broad ligaments to be cut away well down toward the vaginal vault. The blood is carefully sponged away in order to inspect the vessels directly and thus make certain that they have been ligated and that the ligatures are holding.

Too great care cannot be taken in extirpating fibroid tumors of the uterus to avoid damage to the ureters. These structures are usually displaced out and downward upward only if the tumor has grown beneath the ureters into the parametria. At times, too as a result of pressure which displaces and disorganizes the bladder urethra, and ureters, as well as the renal pelves, the ureters become thickened or dilated, a condition adding seriously to the risk of operation. When multiple fibroids, separate from each other are present, these changes are all the more complicated. The corresponding outward displacement of the uterine artery only adds to these complications, so that hysterectomy becomes at times an exceedingly trying procedure.

The question of total or subtotal hysterectomy for fibroids comes in here. There are those who strongly advocate total hysterectomy in every case where one is taking out the uterus for one purpose or another. In my practice that depends entirely upon conditions. Where a woman has been through a pregnancy with or without damage to the cervix I think it is

best to remove the uterus *in situ* when hysterectomy is being performed. Certainly where the cervix has sustained either laceration or inflammatory reaction that should be done without question. In cases such as this, however where the patient has never experienced pregnancy where the cervix is conical where there has been no salpingitis, and especially in the absence of leukorrhoea, it seems unnecessary to remove the entire cervix. The ease of the operation also has a bearing upon the case. In obese women where the depths of the pelvis are not always readily accessible or where the patient is not taking the anesthetic favorably or where, for one reason or another such as heart disease or nephritis complicating the situation, it is desirable to shorten the operation as much as possible, I think that subtotal hysterectomy is advisable.

The lower portion of the cervix being exposed, the anterior cervical wall is grasped below the point where it is desired to amputate it with the volsellum and held up. This incidentally holds away the bladder. The uterus is now amputated with the scalpel by a wedge-shaped incision from above downward through the anterior cervical wall first, and then through the posterior wall. You note that the last ligature on either side has not been cut away. It is my custom to leave these until the cervix is closed, since they are the lowest landmarks showing the extent of our dissection. Before closing the cervix I cauterize it very thoroughly with the electric cautery. This is for the purpose of burning out such cervical mucosa as is left and particularly to produce an obliteration of the cervical canal. I regard this as a very satisfactory substitute for total hysterectomy and as a prophylactic against subsequent cervical discharge. The cervix is closed with kodin catgut which is stitched through continuously from one side to the other the first row closing merely the cervical canal. Starting on the left side, I proceed across the cervix to the right, undersewing the last ligature on each side, after which these are cut away and then, without tying, going back and bringing together the sharp edges of the cervical walls. In doing this we stitch first the right round ligament into the right angle and then finally the left round liga

ment into the left angle, after which the suture is tied. This fixation of the round ligament into the cervical stump not only reinforces the pelvic floor but is the first step in the peritonization of the pelvis.

The raw posterior culdeusac remains uncovered. This is where the uterus was adherent to the rectum and the appendages to the pelvic walls and broad ligaments. Also the posterior vesical wall for a short distance was freed from its adhesion to the anterior uterine wall. The problem confronting us now is the method by which we can safely and thoroughly cover over this raw surface. For many years it has been our preference to effect peritonization of the raw pelvic walls in every case before closing the abdomen. These raw areas are in the great majority of cases posterior to the plane of the broad ligament, that is to say involving in a great majority of cases more or less of the posterior culdeusac. With the round ligaments stitched into the cervical stump and presenting clean peritoneal surfaces, we have left the raw Douglas pouch and, in this instance, a small raw area anteriorly. The sigmoid flexure can be used to very excellent advantage for the purpose of covering over this denuded area. This structure is, therefore, permitted to slide down into the pelvis where it naturally adjusts itself in what might be called a normal attitude. Its adhesion to the left infundibulo-pelvic ligament was not broken up. The round ligaments having been stitched into the cervical stump and the broad ligament posteriorly having been caught in the second ligature on either side, it is seen now that the broad ligaments in this way are pulled in toward the center of the pelvis, and thus peritonization is already effected on the left side for one-half the distance to the round ligament. It remains, therefore, merely to complete the adhesion of the sigmoid flexure to what is left of the raw edge from the left side, across the center to the right side. This is accomplished with a light iodized catgut suture on a small round needle. A simple running stitch whips the sigmoid up against the raw peritoneal edges as from left to right. In the center the vesicoperitoneal flap is brought over from its anterior position before passing on to the right side. In order

to come out posteriorly where the rectal peritoneum is reflected it is necessary to permit the sigmoid flexure to rotate one-half way over. I always aim to accomplish this rotation where the vesicoperitoneal flap is utilized, since here we have the greatest flexibility of tissues and are thus able to avoid tension. As soon as we arrive at the right round ligament we drop at once down to the right pelvic wall. From here on it is merely a matter of whipping the clean peritoneal edge to the sigmoid, passing on over the right ovary and down the right pelvic wall across the posterior pelvic space, and stopping where the rectum is reflected from the posterior pelvic wall, just to the right of the promontory of the sacrum. This line of suture may be carried as high as the brim of the true pelvis if the area of raw surface to be closed over rises that far. It has been observed no doubt, while this simple and yet radical peritonization scheme is being carried out, that but two stitches have actually gone into the intestinal wall, but that the fat tabs have been used almost entirely throughout the entire line of suture. The appendices epiploice are very useful indeed on this so-called high or sigmoid flexure peritonization. Thus the peritonization of the pelvis is completed simply and yet effectively. The idea, as has been explained in previous clinics, is to prevent loops of the small intestine from becoming adherent in the raw areas of the pelvic floor. In the last analysis it is adhesion and kinking of the ileum that produces postoperative distress and partial or complete intestinal obstruction, at least in the lower abdomen, and it is to prevent the ileum from becoming adherent and obstructed that we strive after perfect peritonization. The best way to do this is to go on the principle that something must become adherent to every raw surface that is left in the pelvis. We know that relative fixation of the sigmoid flexure in its normal position is not accompanied by postoperative distress and that it does not produce intestinal obstruction. Therefore, we not only place the sigmoid flexure across such a raw posterior cul-de-sac as we have here, with the idea that it may kindly become adherent, but we determine that it shall become adherent and where this adhesion shall take place.

This same method of sigmoid flexure peritonization, varied according to different pelvic conditions, has been demonstrated in previous clinics.¹

Further examination of the abdomen shows that the stomach, colon, and kidneys are normal. Two large stones are palpable in the gall-bladder. This organ, however, is not enlarged in size and its walls are not thickened. These stones will be left for subsequent treatment. It is not beyond the endurance of every patient to sustain a short, simple gall-bladder operation following hysterectomy but unless circumstances demand such an operation I think it is best to postpone a second radical procedure until another time. The appendix is 3 inches long. It is thick, indurated, and adherent at the tip. We will remove it according to the technic described in a previous clinic, after which the abdomen will be closed, care being taken merely to evert the raw edge of the peritoneum as a last step in the peritonization following abdominal operation.

Examination of the specimen shows that we have a uni-nodular fibroma, 12 cm. in diameter which involves the greater portion of the anterior uterine wall. No degenerative changes have taken place. The uterine cavity is 7 cm. deep. It is regular and its mucosa is normal, at least grossly. The attached tubes show relatively little change in the isthmic portions, but the ampullae are clubbed and closed, with thickening of the walls and mucosa characteristic of the so-called "catarrhal salpingitis."

¹Surgical Clinics of Chicago, Vol. III, p. 1275.

Ibid., Vol. IV p. 179

CLINIC OF DR. DANIEL N. EISENDRATH

MICHAEL REESE HOSPITAL

PYELITIS OF PREGNANCY AND THE PUERPERIUM—A CLINICAL LECTURE

Summary: Presentation of two cases illustrating two distinct types of pyelitis of pregnancy and the puerperium. Differentiation from malaria—simple matter because of the lack of periodicity in the occurrence of chills, fever and sweats. Three clinical types. Methods of treatment. Expectant treatment advisable before resorting to more radical methods.

At the last clinic the subject of renal infection in general was discussed, and several patients illustrating both the hematogenous and ascending routes of invasion shown. I propose today to demonstrate some cases which represent various phases of renal infection as it is found in the pregnant and parturient woman.

Before taking these up in detail let me again impress upon you the necessity of having a clear conception of the various avenues along which infection can reach the upper urinary tract as well as of the pathologic changes in the ureter, renal pelvis and parenchyma, and in the perinephritic tissues, which are the direct sequel of an invasion by bacteria and of the toxins which they produce.

There is but little variation in the clinical pictures resulting from renal infection in the pregnant and non-pregnant female or in the puerperal or non-puerperal state. I mention this particularly because the view still held by many that infection under these conditions differed greatly from ordinary renal infection, has served to greatly delay the diffusion of knowledge of the subject. The sooner we learn to recognize this similarity and to treat the conditions along the same lines, the better will be our end-results.

of chills, fever and sweats in our case of pyelitis of pregnancy was overlooked and the diagnosis of malaria erroneously made. The first physician who was consulted thought that every patient with recurrent chills, fever and sweats must have malaria. Let me digress for a moment to direct your attention to other conditions than malaria and pyelitis which can cause recurrent chills, followed by high temperature and sweats. I will only mention the more common causes of such cycles which are of interest to surgeons.

1. Infection anywhere within the vascular system, for example, a septic phlebitis whether it be in the peripheral veins, as in the extremities, or in the veins of the broad ligament, or in the veins of the portal system especially in those within the liver itself that is, a suppurative pylephlebitis.

2. Infections within the intrahepatic bile-passages to which Charcot gave the name of intermittent hepatic fever on account of the resemblance of the condition clinically to malaria.

To return to our patient, we felt that we could rule out an acute appendicitis because the tenderness over McBurney's point could only be elicited on deep pressure and was localized at a point where the right ureter crossed the iliac vessels. There was none of the muscular rigidity present which one would expect if an acute inflammatory lesion of the right lower quadrant was present. Besides, recurrent cycles of chills, fever and sweats never occur in acute appendicitis unless an accompanying infection of the veins of the meso-appendix is present with extension into the radicles of the portal vein. The local findings not justifying the diagnosis even of an acute appendicitis, it seemed improbable that such a grave complication as a septic pylephlebitis could be present.

The ilio-costal tenderness, the presence of a moderate pyuria, and the fact that these findings associated with recurrent chills and fever are a frequent syndrome found in the pyelitis of pregnancy led us to conclude that the latter condition was present. We felt that the case belonged to the moderately severe type of the disease, and if it did not respond to expectant treatment that a lavage of the renal pelvis should be done. The bladder

The first case which I will present today is the wife of a physician who is a primipara in the sixth month of pregnancy. About three weeks ago while visiting her parents in an adjacent city she was suddenly seized with a chill followed by high fever and this by profuse perspiration. During the next ten days this cycle of chill, fever and perspiration recurred a number of times. In the absence of any localizing signs a diagnosis of malaria was made although no plasmodia were found. She was brought to this hospital about one week ago and appeared extremely ill when first seen by me in consultation. Her temperature was 103° F and pulse 120. Examination of the heart and lungs revealed no abnormal condition. The abdomen was slightly distended. On palpation, there was distinct tenderness on deep pressure over McBurney's point in the right iliac region and also over the right ilio-costal space behind. Neither kidney was enlarged, but the right one seemed to be tender on bimanual examination. The urine contained a moderately large number of pus-cells. Cystoscopy and ureteral catheterization were not done. The diagnosis rested between an acute appendicitis in pregnancy and a right-sided pyelitis. We could easily explain the recurrent cycles of chills, fever and sweats as being due to a renal infection because such a clinical picture is very common in some cases of pyelitis. The resemblance between similar cycles of rigors followed by fever and sweats without any localizing signs as seen in malaria to those so often seen in pyelitis has given rise to the term "pseudomalarial type of pyelitis" to express the clinical resemblance of these two widely different infections. With the presence of localizing signs such as I have described as being found on abdominal examination it was not deemed necessary to examine the blood for malaria. Another very important clinical difference between the cycles of chills, fever and sweats as seen in true malaria and those due to pyelitis or to any other forms of pyrogenic infection is the irregularity in the occurrence of the cycles in the latter affections. This lack of periodicity is the first guide-post which should lead the careful physician to look for other causes than malaria.

It is not strange that this lack of periodicity of the cycles

non-gonorrhoeal cystitis. Hexamethylenamin was given in large doses (60 grains daily for two days) and large quantities of water. The prompt cessation of the fever (Fig. 371) and abdominal symptoms was accompanied by the disappearance of the pyuria, and the patient was discharged about a week later.¹

This case belongs to the group of mild or even moderately severe pyelitis such as is quite often seen during pregnancy and in the puerperium.

Pyelitis occurring during pregnancy only differs from the same affection as seen in the puerperium in a few minor details. These are, first, the period at which the infection of the renal pelvis manifests itself clinically and second, that in pyelitis of the puerperium one must consider infections of the internal genitalia, especially those involving the veins of the broad ligament, in the differential diagnosis of the case. In other respects the two conditions present so many features in common that I will consider them together in our more systematic discussion of the subject.

Pyelitis of pregnancy is believed by many competent observers to be a persistence of an infection of the renal pelvis as seen so frequently in young girls. That a pyelitis of the puerperium is simply a lighting up of a latent condition existing during pregnancy does not require much argument.

The colon bacillus is responsible for over 90 per cent. of the cases, both in pregnancy and in the puerperium. The remaining 10 per cent. is the result of invasion by the ordinary pyogenic organisms, especially the staphylococci. The variation in virulence of different strains of the colon bacillus and the difference in resistance of individual patients explains the clinical observations as to variation in severity of the condition.

The organisms reach the renal pelvis by way of one or more of the following routes: (a) The hematogenous or descending. The organisms enter the general circulation from the tonsils, teeth, intestine, etc., and are excreted into the renal pelvis after passing through the blood-vessels of the kidney; (b) the organisms enter the rich lymphatic network (Fig. 372) of the internal

Pregnancy continued without further recurrence of symptoms or pyuria.

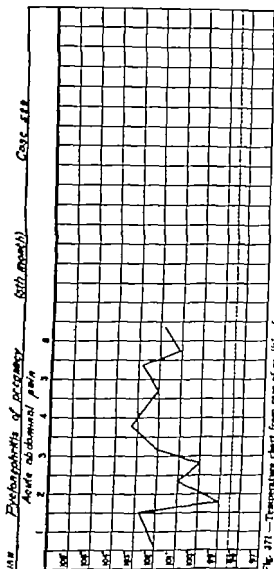


Fig. 371.—Temperature chart from case of pyelitis of pregnancy. The principal symptom was acute abdominal pain following chills and fever which latter occurred before entering the hospital.

was irrigated daily with a solution of 1/5000 nitrate of silver which I have found to be very efficacious in the treatment of

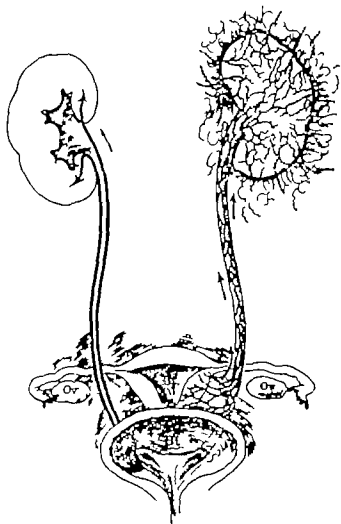


Fig. 572.—Diagrammatic representation on the right side of the mode of transmission of infection along subcutaneous lymphatics from bladder to kidney. On the left side is shown in diagrammatic manner the mode of transmission of infection along the perireteral lymphatics from the internal genitalia of the female to the kidney. Note also communication of the perireteral lymphatics with the lymphatics of the fatty capsule of the kidney.

genitalia of the pregnant or puerperal woman and then ascend by way of the lymphatics of the submucous or perimetrical coats of the ureter (Fig. 372) to the renal pelvis (c) the organisms ascend to the renal pelvis along the mucous membrane of the ureter from the bladder and urethra in the female (d) from the colon directly to the kidney by way of the lymphatics passing directly between these two structures (Fig. 372). It is impossible to determine with accuracy which route is most frequently followed, but I believe that as large a number of cases are due to invasion by way of the lymphatics of the ureter as through the bloodstream.

Infection of the right renal pelvis is far more common than is that of the left—in the proportion of 3 to 1. When both kidneys are involved, the right one is predominantly so. The condition usually manifests itself during the latter half of pregnancy while in the puerperium it is most often seen during the third to sixth week after delivery.

There is much difference of opinion as to why a pyelitis should occur during pregnancy. Some authors believe that the pressure of the fetal head causes an obstruction of the ureter at the point where this structure crosses the iliac vessels, that is, at the brim of the bony pelvis. Others think that the body of the uterus which is rotated to the right causes such an obstruction. There can be no doubt that the ureters are usually found dilated during pregnancy and that this causes a slowing up of the urinary stream. We know that any condition which causes such a stagnation favors the localization in the renal pelvis of organisms which are constantly being excreted through the kidneys. Again, you can readily understand how such an organism as the colon bacillus, which has remained latent in the renal pelvis of the female since childhood, can be suddenly aroused to activity under such favorable conditions.

The more persistent the infection, that is, the longer it has lasted, the more advanced are the changes in the form of infiltration of the walls of the renal pelvis and ureter with its accompanying dilatation of the lumen, to which Braasch first directed our attention. The importance of these chronic inflammatory

tion at once, while in others these are entirely lacking, as will be seen in the case which I will next present.

This patient is a twenty year-old primipara. She was confined in this hospital and seemed perfectly well until about the end of the third week of the puerperium, when her present illness began suddenly with a chill, followed by high fever and a sweat. Examination of the internal genitalia failed to reveal any possible cause for the chills and temperature. There were absolutely no localizing symptoms anywhere especially none referable to the urinary tract, for three weeks after this stormy onset. Blood-cultures were negative throughout this period, during which the cycles of chills, fever and sweats recurred at irregular intervals (Fig 373). At one time without any specific treatment the temperature dropped to normal for ten days as suddenly as the cycles of chills, etc. had appeared. Then the clinical picture as unexpectedly became one of a severe type of bacteriemia and a diagnosis made of septic endocarditis. Recurrent chills and high fever (Fig 373) followed each time by a profuse perspiration and accompanied by an extremely rapid pulse, made the prognosis a very grave one, particularly as no local focus could be found by her attending physician.

When she was first examined I was puzzled as to the underlying source, until it occurred to me that a pyelitis might give rise to such a clinical picture of severe sepsis with slight or even no localizing symptoms referable to the urinary tract. Permission to make a thorough urologic study of the case was obtained, and a cystoscopic examination revealed a reddened and swollen right ureteral orifice, but an otherwise normal bladder. The urine obtained from the left kidney was clear but that from the right contained in the sediment on staining a relatively large number of Gram-negative organisms which further cultural observation revealed to be a strain of the colon bacillus.

The renal pelvis was irrigated (Fig 371) with a 1:1000 solution of silver nitrate and about 5 c.c. of a 1 per cent. solution left *in situ* before the ureteral catheter was withdrawn. After the first pelvic lavage she had one chill, but after a second one there was an absolute cessation (Fig 373) of the septic symptoms

changes was emphasized in our previous lecture. My only object in speaking of it again is that it explains our inability to cure many of the severe cases of pyelitis, especially in pregnancy and in the puerperium.

The clinical picture of most severe bacteriemia seen in so many of these cases is the direct result of invasion of the bloodstream by organisms from the local area of infection in the renal pelvis. Magoun has recently demonstrated this experimentally in a most convincing manner.

CLINICAL PICTURES

As was explained just a moment ago the difference in the severity of the clinical pictures is almost always due to a variation in virulence of the causative organism.

One encounters three types clinically namely: (a) the mild, (b) the moderately severe, and (c) the very severe.

In the mild ones there may be absolutely no symptoms, our attention only being directed to the kidney infection by the persistent pyuria or bacteriuria. You must understand, of course, that there is often no sharp line of demarcation between these three types. A renal infection which has at the onset presented the mildest possible symptoms may suddenly change to a severe sepsis. Before taking up these three clinical pictures under which the pyelitis of pregnancy and of the puerperium presents itself, let me emphasize two findings which vary greatly in individual cases. These are (a) symptoms referable to the bladder and (b) the degree of evidence of infection as found in the examination of the urine.

I will dwell upon the first one particularly because one encounters so many cases of renal infection in which symptoms such as increased frequency painful urination, etc. are but little complained of. In fact, even experienced clinicians are apt to be led astray and demand more evidence in the form of bladder irritation before being willing to even consider the urinary tract as the source of the symptoms.

We often see cases of the pyelitis of pregnancy and of the puerperium in which the bladder disturbances attract our atten-

cases of the different degrees of renal infection do not show any bladder symptoms which would lead even the most thorough observer to consider some affection of the urinary tract as the source of the symptoms.

The second point which I have tried to emphasize today namely that a relatively clear urine does not exclude the possibility of an infection of the upper urinary tract, is equally well illustrated by this case. Ordinary microscopic examination of the urine will often give no clue to the presence of such an infection. There may be an absence of pus for days or the urine may only be cloudy from the presence of a large number of bacteria, a condition called bacteriuria. It is only by repeated study of the mixed urine (that is, from the bladder) or better still, by staining the sediment after prolonged centrifugalization of the urines obtained from each kidney by ureteral catheterization, that a positive diagnosis can be made. I might mention here that this is the only reliable method to determine whether the infection of the renal pelvis has been cured. Cultural study is becoming less frequently employed at the present time than staining of the sediment.

It scarcely seems necessary to describe in detail the symptoms of the mild, moderately severe, and very severe types of the pyelitis of pregnancy and the puerperium. They differ only in degree. In the milder form there may be a moderate rise in the temperature and pulse-rate, or these may be normal. Back ache or more localized pain and tenderness over a single kidney or referred to the lower abdomen may be the only symptoms which attract our attention. As I have just stated, the urine may not enable us to confirm our diagnosis of a pyelitis.

In the moderately severe cases the clinical picture is very much as in the case of pyelitis of pregnancy which I presented at the beginning of our clinic. The pain and tenderness over one or both kidneys and in the lower abdomen, especially over McBurney's point on the right side, are, as a rule, more marked. In pregnancy we must consider salpingitis, appendicitis, twisting of the pedicle of an ovarian cyst or dermoid, or even an acute cholecystitis in the differential diagnosis. The fever is usually

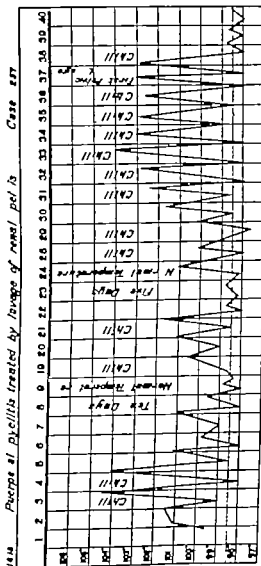


Fig 373.—Temperature chart from case of puerperal pyelitis illustrating how the clinical pictures of most severe generalised sepsis may be caused by an infection of the kidney with practically no localising signs.

and an uneventful convalescence followed. I have shown this patient because her case illustrates my statement that many



Fig. 374.—Diagrammatic representation of method of performing pelvic lavage for pyelitis. The ureteral catheter shown in black passes up to the pelvis of the kidney where the solution used for pelvic lavage is deposited directly upon the affected mucous membrane of the renal pelvis.

of the remittent type, but may be continuous. Recurrence of the high temperatures may or may not be preceded, as was seen in our patient, by a chill.

During the puerperium the first thought is that an infection of the uterus and adjacent structures has occurred, but this can be ruled out in the majority of cases. One is apt to be led astray in some patients, however upon bimanual examination by the presence of a localized area of tenderness in the broad ligaments, because such an increased sensitiveness may be due to an enlarged and inflamed ureter which is often to be felt as a tender cord. Colic and profuse hematuria are not frequently seen in these cases but the possibility of the occurrence of such symptoms must not be forgotten in every form of renal infection.

In the very severe form symptoms which direct our attention to the kidney retire more and more into the background. The clinical picture, as in the case of pyelitis of the puerperium which I have just presented, becomes more and more that of a severe bacteremia without localizing symptoms unless a pyonephrosis or a perinephritic abscess develops.

TREATMENT

The treatment of pyelitis of pregnancy and of the puerperium has been completely revolutionized since Stoeckel showed that it is possible to abruptly terminate the majority of the cases, especially the more severe ones, by lavage (Fig. 3-4) of the renal pelvis. More recently Caulk and others have shown that provision for free drainage of the infected renal pelvis through the employment of the ureteral catheter alone suffices to accomplish the same results as lavage if the pelvis is not dilated too much.

That spontaneous recovery will take place in many cases without the application of these two therapeutic methods cannot be denied, and I cannot urge you too strongly to give the so-called expectant methods a trial before lairage or ureteral catheterization alone are used. On the other hand, there is but little indication to terminate pregnancy until the more recent methods just mentioned have been given a thorough trial.

been begun, it should be continued until negative smears or cultures have been obtained because a recurrence is very likely to take place unless a complete cure is possible. The prognosis should always be guarded if only a cessation of symptoms has occurred.

For lavage of the renal pelvis nitrate of silver surpasses in efficacy all other remedies. I first irrigate with a 1/1000 solution and then use stronger ones up to 2 per cent.

I have had no personal experience with catheter drainage alone, but Caulk speaks of it very highly and believes that it will cure all except the cases where the renal pelvis and ureter are dilated as the result of long-standing infection. A single treatment may suffice in the majority of cases to produce a symptomatic cure, and even the pyuria may cease, but, as was just stated, one should continue treatment if possible until a bacteriologic cure has been obtained. If the symptoms of severe sepsis continue in spite of pelvic lavage or simple catheter drainage, do not fail to look for some obstruction in the ureter or for a possible complication in the form of a pyonephrosis or a perinephritic or perireteral abscess. Our first case of today thus shows the possibility of symptomatic cure in a moderately severe case of the pyelitis of pregnancy by conservative that is, indirect methods, and of a rapid and almost theatrically striking cure in the second case by the more direct methods.

By expectant treatment I mean rest in bed as much as possible, drinking of large quantities of water a bland diet, and the administration of urinary antiseptics in as large doses as the patient will tolerate. You may think that I am rather radical when the statement is made that the administration of drugs or special waters to render the urine either acid or alkaline is not any more efficacious than the simple dilution of the urine by drinking water freely. I have seen equally good results by this simpler method, and Graff in a recent article on the entire subject of renal infection has expressed a similar opinion.

Local treatment of the bladder in the form of irrigations is of little benefit.

One must not forget that even though the symptoms have subsided, the infection in the renal pelvis may become latent, only to recur in future pregnancies or as in our second case of today's clinic, at a later period of the puerperium.

The following factors are not to be overlooked in both the expectant method of treatment as well as in the more direct one:

(a) There may be an obstruction present in the ureter for example, calculus, stricture, twist, etc.

(b) The pyelitis may have existed for many years and resulted in changes in the wall of the ureter and of the renal pelvis, with the resultant dilatation of the lumen to which I have directed your attention in my first clinic on renal infection.

(c) Some of the strains of *Bacillus coli* and especially staphylococci are very resistant to bactericidal agents.

If lavage of the renal pelvis or simple passage of a ureteral catheter has not been successful, one must always bear in mind the possibility of the existence of one or more of the above causes.

Now as to the more direct methods, these are indicated (a) in every case where the more conservative treatment has failed, (b) in the more severe types without losing any time in the employment of less radical measures. Those who are interested will find reports of a relatively large number of cases so treated with success. The termination of pregnancy was quite frequently avoided. When pelvic lavage or ureteral catheterization has

CLINIC OF DR. HERMAN L. KRETSCHMER

PRESBYTERIAN HOSPITAL

ELUSIVE ULCER OF THE BLADDER

Synopsis: A rare bladder lesion—etiology pathology diagnosis, and treatment. Resemblance to tuberculosis of the bladder. Presentation of patient previously operated for elusive ulcer of the bladder.

To Hunner of Baltimore, belongs the credit for having called attention to and for having devised a form of treatment for a rather unusual type of bladder lesion. This lesion Hunner has called for want of a better name, "elusive ulcer" using this term because these patients have gone about with a lesion unrecognized and undiagnosed. Recently Keene has suggested the name of "circumscribed panmural ulcerative cystitis," believing that this better describes the lesion than the term suggested by Hunner.

Nitze, in his book on Cystoscopy describes a lesion which apparently is similar to the one described by Hunner under the name of 'parenchymatous cystitis.

Hunner has called attention to the fact that he has met this lesion only in women, and that these women have usually been subjected to operations without relief and have been subjected to various forms of bladder treatment without relief, after which they were usually put into the discard as "neurotic bladders.

The patient that I wish to present is one in whom a diagnosis of elusive ulcer was made and upon whom I operated. There are several interesting features in this patient's condition, and before demonstrating her I wish to briefly go over her history which is as follows:

Previous history shows that she was cystoscoped four years ago and no diagnosis made. One year ago she was examined roentgenologically and a diagnosis of tuberculosis of the kidneys and bladder made. The patient has never been pregnant and

Pupils react to light and accommodation. The knee-jerks are exaggerated.

Abdomen.—The lower pole of the right kidney is palpable. The left kidney is movable (first degree). There is tenderness along both ureters, which is especially marked over the bladder.

Röntgen ray examination is negative for the presence of stone in the urinary tract and also for bone changes.

Because of the history a careful search was made for tubercle bacilli, and many catheterized bladder specimens were examined without being able to demonstrate the tubercle bacilli.

Cystoscopic Examination.—This was very difficult, so that it was necessary to give her a little gas. In the apex of the bladder was seen an area of superficial ulceration surrounded by a zone of hyperemia. A small shred of mucopus was seen adhering to the surface of the ulcer. The neck of the bladder and the ureteral orifices were normal. The ureters were catheterized without difficulty or obstruction. Examination of the separated urines showed the following

	Cell counts.	Cultures.	The examination.
Bladder	1030	Sterile	Negative
Right kidney	1420		
Left kidney	160		

In order to exclude tuberculosis guinea-pigs were inoculated with the urine from the right and left kidneys and bladder. At the end of six weeks the three pigs were autopsied and failed to show the presence of tuberculosis. Two subsequent examinations of the bladder urine obtained by catheter showed the following

	Cell counts.	Cultures.	The examination.
First examination	400	Sterile	Negative
Second examination	250	"	

Not being satisfied with obtaining one set of negative guinea pigs, it was decided to inoculate another set. Cystoscopic examination was again carried out under gas, and showed practically the same findings as were demonstrated at the first examination. The ureters were catheterized without difficulty or obstruction. Examination of the urine showed

there is no history of miscarriages. Menstruation is very painful and of five days' duration.

Present Illness.—Her chief complaints are

- 1 Painful urination.
2. *Frequency of urination.*
- 3 Pyuria.
4. Hematuria.
- 5 Pain in the back.

Onset.—Four years ago without apparent cause she began to note that she was obliged to void more frequently than had been her custom. Associated with the frequency of urination there was *painful urination*. These two symptoms have progressively become worse, especially so during the past two years, until now the trouble is very severe, causing her to be very nervous and very weak. The pain is described as like a toothache. It occurs during the act of urination and is associated with severe spasm at the end of urination. The pain is located at the neck of the bladder. The frequency of urination has progressively increased from four to five times during the day to every half-hour. At night she formerly voided once or twice, but at the present time she is obliged to void eight times.

Pyuria.—The patient states that since the onset of the trouble the urine has been cloudy and contains fine flesh-like shreds.

Hematuria.—The patient has occasionally noticed a little blood in the urine, staining the night clothes. The last time she noticed the blood was two months ago. She has never passed clots nor at any time has the urine been wine colored.

Pain in Back.—This is located in the lumbar region on both sides and is described as a dull ache associated with urination. At times she experiences twinges of sharp, needle-like pains in the kidney region and over the bladder.

General.—The patient has lost 10 pounds in weight during the past two years. Her appetite is fair. The bowels move daily causing spells of severe pain in the bladder.

Physical Examination.—The patient is a pale, anemic looking nervous individual. Head and neck are negative, as are also the heart and lungs.

ulcer-bearing area of the bladder. This was done by means of scissors. After controlling the bleeding points from the cut margins of the bladder the bladder was closed with interrupted catgut sutures. The mucosa was not included in the sutures. A rubber drain was inserted into the bladder for drainage. A small strand of gauze was placed in the space of Retzius and another gauze wick was placed between the bladder and the peritoneum. The gauze drains were removed at the end of forty-eight hours. The rubber tube was removed on the fifth day.

Histologic examination of the ulcer bearing area showed the presence of an ulcer in the mucosa. A good deal of hemorrhage was present. In the submucosa were seen large areas of dense round-cell infiltration, which apparently decreased in density from the center out. There were also seen some areas of hemorrhage. The muscle fibers were not involved in this process to the same degree as the submucosa, but there were occasionally seen areas of round-cell infiltration and hemorrhage. A large amount of new blood formation was found in the submucosa.

Examination of the abdomen today shows the presence of a suprapubic scar which is perfectly healed. Since the operation the patient has been absolutely free from pain both between urinations as well as at the time of urination. As a result of the wide resection there is a definite diminution in the bladder capacity so the patient does not at this time void a normal amount of urine. The intervals between urinations have been markedly increased, so that at the present time she is obliged to void only two or three times at night and every two or three hours during the day.

Nothing is known of the etiology of this condition. Hunner has thought of the possibility of focal infection, and in the cases in which he attempted to find foci of infection he was unable to definitely establish a connection between them and the production of ulcer. Examination of our patient for the presence of foci of infection has been negative. One factor in the etiology that has been brought out up to this time is that all or nearly all of these cases have occurred in women. There seems to be no connection between the lesions of the gynecologic tract and the

Bladder	} Negative for tuberculosis.
Right kidney	
Left kidney	

A second set of guinea-pigs were inoculated with urine obtained at this cystoscopic examination. These guinea-pigs failed to show the presence of tuberculosis.

Hunner in his article, says that he suspects chloive ulcer in patients who have a history of frequent and painful urination, in whom the urine is clear and the sediment shows a few leukocytes and red blood-cells. It will be seen from the examinations made of the urine obtained from ureteral catheterization that the findings in this case do not tally with Hunner's findings, inasmuch as every specimen of urine examined showed the presence of a small amount of pus. Because of this fact we were at first somewhat skeptical about making a diagnosis of chloive ulcer. However having ruled out tuberculosis, it seemed to me that the only diagnosis one could make was that of chloive ulcer. The cystoscopic findings seemed to tally closely with the cystoscopic findings reported by Hunner and the patient was advised to consider surgical treatment.

As has been pointed out by Hunner nothing short of a radical operation gives these patients relief. The patient consented to operation, which was carried out under ether anesthesia. The usual suprapubic incision was made and the peritoneum dissected from the bladder. There was a good deal of difficulty in removing the peritoneum just behind the apex of the bladder. The peritoneum was apparently bound down by an inflammatory process, as a result of which the peritoneum was accidentally opened. This was immediately closed with a fine catgut suture without any consequence thereof. After the peritoneum was freed the wall of the bladder felt thick, hard, and indurated. After the peritoneal dissection was completed the bladder was opened by a median incision. At the junction of the apex of the bladder with the posterior superior wall there was seen an area of ulceration about 3 to 4 mm. in diameter. This was surrounded by a distinct area of hyperemia. A small amount of edema was seen. It was then decided to carry out a resection of the

CLINIC OF DR. EDMUND ANDREWS

MERCY HOSPITAL

LARGE STRANGULATED UMBILICAL HERNIA

Summary: Sudden strangulation of an umbilical hernia that had been present for fifteen years without producing any symptoms. Operation revealed multilocular sac. Resection of adherent omentum and core of the hernia. After-treatment in patients who are markedly obese.

THE patient is a colored woman, aged about forty five, who has had an umbilical hernia for about fifteen years. It began as a small mass that appeared only on straining, was never painful, and gradually increased in size. For the last ten years it has always been out when she was up and about, but disappeared during the night. There never has been any pain, but at times a slight feeling of heaviness was present. She has never worn a truss or support of any kind, in spite of the fact that she has always done hard manual labor. About six months ago she had an attack of vomiting and pain in the abdomen which lasted three hours and disappeared without any treatment.

At 2.00 A. M. this morning she was taken suddenly with a severe pain in the abdomen, not well localized, and violent nausea and vomiting. She was seen at that time by Dr. F. M. Drennan, who was able to reduce the hernia with very little pressure. He was called again, however at 7.00 P. M. and found that the symptoms had not been relieved, and immediately made the diagnosis of reduction ~~as~~ *was* with strangulation and sent her into the hospital for operation.

The patient is an extremely obese colored woman, apparently in acute pain and in a marked degree of shock, with temperature 100° F., pulse 120 and respirations 30 short and catchy. The findings are negative except for the abdomen, which is extremely

production of this type of ulcer. Pregnancy does not seem to play a rôle.

The two symptoms of which most of these patients complain are frequency of urination and painful urination. Humer says whenever he sees a woman with frequency and painful urination, clear urine, and sediment showing a few leukocytes and a few red blood-cells, he makes a provisional diagnosis of so-called elusive ulcer. That elusive ulcer may occur with the presence of a large amount of pus has been demonstrated by this patient. Not only did this patient have a large amount of pus in the bladder urine, but the leukocyte count on the urine showed pus-cells both in the right and left kidneys. Because of the presence of pus in the sterile urine associated with areas of ulceration it just occurs to me that some of these patients are mistaken for cases of urinary tuberculosis. The fact that we suspected that this patient had tuberculosis of the urinary tract is evident because we lost two sets of guinea-pigs in order to definitely exclude urinary tuberculosis.

With reference to the treatment there seems to be only one form of treatment that offers these patients any chance for relief, and this is wide resection of the ulcer-bearing area. Fortunately in most of these cases the ulcer-bearing area is located in the apex of the bladder or in a part of the bladder that can be resected very easily. Should the ulcer be located along the ureteral orifice it would, of course, necessitate a transplantation of the ureter.

Prognosis.—With reference to cure, if these patients are operated upon, the outlook for cure is very good, but in order to obtain this prognosis, as stated above, it is necessary to resect very widely the ulcer-bearing area. The cases so far reported in the literature have been too scant to permit of any statements regarding recurrence.

Postscript.—A recent report from this patient states that she is free from pain for the first time in four years, and that the frequency of urination has practically disappeared. She now urinates at normal intervals.

to the inside, and in several it is markedly edematous. One loop of jejunum is found in the largest cavity. It is dark and cyanotic and has a few slight subperitoneal hemorrhages. Its viability is doubtful and I will return it to the abdomen and examine it again later then deciding if it will have to be resected. There is a small amount of clear fluid in the abdomen and in several of the loculi I find some bloody fluid. Several attempts are made to free the omentum from its almost universal adhesions to the interior of the multilocular sac, but as this is consuming much time and the condition of the patient is very bad, her pulse having gone from 120 to 150 a more rapid means is sought. The transverse colon is pulled out and the entire pedicle of the omentum ligated in three ligatures and severed. The whole of the omentum lay in the sac and was almost universally adherent. Next the whole sac and omentum is rapidly cut away right down to the ring, there being very little hemorrhage. Then the cord, mentioned above, leading to the umbilicus is incised and found to contain adherent omentum and a little bloody fluid, being a separate hernial sac. This also is freely excised.

The opening is now enlarged upward in the midline for about 1 inch and the two holes cut into one. This makes it possible to introduce the hand into the abdomen, and nothing is noted except a few small fibroids in the uterus. The injured bowel is now examined and seems to be recovering nicely. There are two small hemorrhages on it and one in its mesentery.

The closure is made by pulling the left side under the right with three mattress sutures of heavy kangaroo tendon. This secures about 1 inch of overlapping. The free edge is now sewed down with a continuous locked stitch of somewhat smaller kangaroo tendon. A running plain catgut stitch in the subcutaneous fat and a few interrupted in the skin complete the operation. A folded gutta-percha is left under the skin. This is necessary not only to take care of any oozing of blood but also because all strangulated hernia wounds are potentially infected.

Such a radical procedure as the resection of the entire omentum may be questioned. I believe it was justifiable here on account of the great amount of time it saved. The operative

fat and pendulous. At and above the umbilicus is a swelling as large as an adult's head. There is a marked impulse on coughing. Careful percussion over it gives no tympany at any point. There is only slight tenderness to touch. The skin is extremely thin over the mass and is freely movable on it. By gradual gentle compression the entire mass, which is soft and nodular can be returned to the abdomen. The outline of a ring about 3 cm. in diameter can be felt just above the umbilicus, and in the umbilicus itself is a cord-like mass about 2 cm. in diameter which is irreducible. The rest of the abdomen is of board-like rigidity.

A previous similar reduction by Dr. Drennan did not relieve the symptoms, so it is evident that we are dealing with a strangulated umbilical hernia which is reducible *en masse*. The indications are for immediate operation. The lack of tympany over such a large tumor makes it probable that the contents are mostly omentum, but does not absolutely rule out the possibility of a strangulated piece of bowel. A point more against this is the fact that the pain and vomiting are not excessive, as one would expect if the bowel were gangrenous. If it is bowel, I know it is not the colon because she has passed a large amount of gas per rectum. The transverse colon is the usual organ found in these herniae. The board-like rigidity of the abdomen, however, points unmistakably to the fact that some intraperitoneal organ is compromised.

During the struggles under ether the hernia has again protruded. I will leave it so. An elliptic incision about 5 inches long is made to include the umbilicus. In this case the incision is made longitudinal instead of transverse, as is usual in the Mayo operation, because of the likelihood of having to enlarge the ring and resect a piece of intestine. In that case I would rather cut in the midline and then close by overlapping from side to side.

The elliptic flap of skin except a pedicle to the umbilicus is now excised, the skin to the margins of the wound dissected back, and the sac freed without opening it. It is now incised and proves to be a multilocular one, as is usual in these cases. Ten or twelve locules are opened and each contains omentum adherent

would have been better to have opened both rectus sheaths, and sowed the anterior and posterior sheaths and muscle separately but the method used was quicker and speed seemed very necessary

Postoperative Course.—While coming out of the anæsthetic the patient struggled violently tearing part of the bandages and pulling out the drain. It was not reinserted, but four days later a probe was introduced and some secretion drained off. This discharge continued for about three weeks. Except for this, her convalescence was uneventful and she left the hospital at the end of three weeks. A firm binder was ordered to be used while she was up and about. One of the most important points in the after-treatment is the diet. It is absolutely essential that we get rid of a lot of the fat. Unless the intra-abdominal pressure is reduced by this means, a recurrence is sure to come. It is not our usual custom to provide a truss for these cases but until a great deal of weight has been lost I think it safer to use it in this case. When, however her enormous adiposity has been reduced to more moderate proportions the belt should be discarded.

mortality of all strangulated hernie is about 50 per cent., and in such large umbilical ones much higher. The shock is always great and the need for haste most urgent. In this case the pulse was 120 to begin with and rose to 160 during the operation. The patient received 2000 c.c. normal salt solution under the breasts during the operation. If I had dissected the omentum

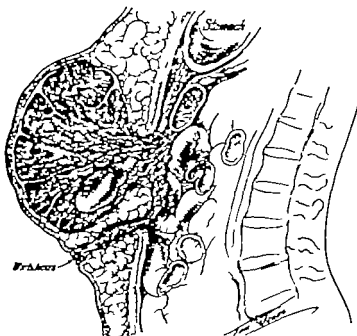


Fig. 375.—Sagittal section showing relation of hernial sac and contents. Dotted line shows point of amputation of omentum.

free from the sac, it would have consumed a great deal of time. Such a long and tedious dissection, involving as it must a serious loss of blood, might well have been fatal. Also the omentum would have been left with an enormous number of ligatures on it, and it was curled up into a ball, and not a typical thin sheet. As it was its rapid removal enabled me to get through in seventy minutes. The same may be said of the method of closure. It

would have been better to have opened both rectus sheaths, and sowed the anterior and posterior sheaths and muscle separately but the method used was quicker and speed seemed very necessary

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CLINIC OF DR. VERNON C. DAVID

PRESBYTERIAN HOSPITAL

TREATMENT OF ACUTE SUPPURATIVE ARTERITIS OF THE KNEE-JOINT

Summary: Streptococcal arthritis of knee-joints coming on during the final stage of bronchopneumonia. Method of handling infected knee-joints in military hospitals applicable to civil practice.

THE patient about to be operated upon was transferred to the surgical department with the following history

He is a white male, forty years old, who worked as a laborer until three weeks ago when he was obliged to stop work on account of an acute bronchitis which was associated with fever, pain in the chest, and some dyspnea. From the history he might easily have had a bronchopneumonia. He entered the hospital a few days ago because of bilateral swelling of the knees and legs below the knees, which trouble began just as his pulmonary lesion was subsiding. The swelling of the knees was acute in onset and was associated with marked pain on movement and complete inability of locomotion.

The patient looks ill and complains of pain in both extremities. His temperature is slightly elevated and his pulse-rate varies from 100 to 110. On examination of the chest a few rales are heard over the base of both lungs, but there is no evidence of consolidation. The urine is negative and the leukocyte count is 14,000. Both knees are markedly swollen, though the skin is not reddened. On both sides the patella floats and the quadriceps bursa is so distended that it can be plainly outlined up to the lower third of the thigh. Below the knees the legs and ankles are swollen and the ankles are painful on motion, but no fluctuation is present over them and the skin is not hyperemic,

but pits easily on pressure. An aspirating needle attached to a Luer syringe was inserted into each knee-joint, starting high up along the outer aspect of the knee and inserting the needle very obliquely under the patella. On both sides a creamy

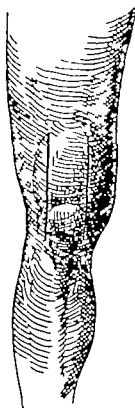


Fig. 376.—Diagram of swollen knee showing parallel lines of incision

yellow pus was withdrawn, which on culture proved to be *Streptococcus hemolyticus*. We have, then, a bilateral hematogenous infection of both knee-joints with the *Streptococcus hemolyticus*, and we will now discuss the character of surgical treatment to be instituted.

Before the war it was fairly common teaching to advocate complete immobilization of infected joints after drainage, and following this dictum the end result was practically always ankylosis. Due principally to Willem's work a radical change in the treatment of infected joints was instituted during the war. Willem's advocated thorough drainage of the infected joint followed by immediate mobilization and movement of the joint by



Fig. 377.—Photograph of patient showing healed scars of incisions made for the treatment of suppurative arthritis of the knee joints.

the patient's own efforts and not by passive mobilization by the surgeon's or attendant's efforts. He contended that by this method of treatment better drainage of the joint was effected and much better function of the joint obtained than by other methods of treatment. In 1918 he reported 20 cases of infection of joints, 13 of which had practically normal motion after being treated in this way. Willem's not only insists on immediate

active motion of the joint after operation but in his knee-joint infections he has the patient walk on the leg and at every flexion and extension of the joint pus is squirted out of it. This method was used wherever possible in the American hospitals in France, where infections of the joints not infrequently followed gunshot wounds of the joints. Where oblique fractures of the shaft of the tibia or femur entered the joint it was manifestly impossible



Fig. 378.—Photograph taken after operation showing degree of flexion in both knees.

to begin active motion of that extremity but where *débridement* of the joint had been done and the loose fragments of bone removed, active motion of such joints could often be instituted. We were able to begin active mobilization of fifteen infected knee-joints which we were obliged to drain after gunshot injury of the joints. At the end of an average of forty-five days these joints had practically normal motion and all had 20 degrees or more of active flexion. The joints that were immobilized after drainage

because of previous immobilization of the joint, extensive periarticular infection, large wounds of the soft parts in the region of the joint, or fracture of the shaft of the tibia or femur into the joint, had an average range of motion of less than 10 degrees of active flexion after three months.

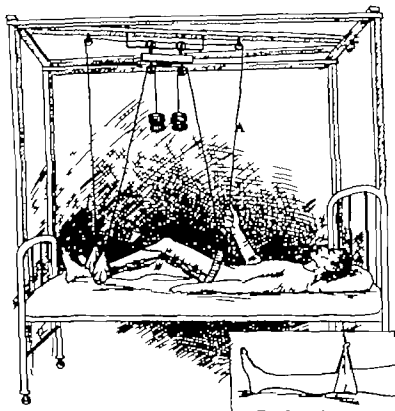


Fig. 379—1. In order to extend the leg for active motion the patient may by traction on the rope (A) extend the leg as in B.

In the patient we have for operation this morning we shall make a long parallel incision on both sides of the patella, starting just below the inferior border of the patella and extending to the upper limit of the quadriceps bursa. Each incision is about 8 inches long. The blood-vessels in the cut quadriceps muscle

are caught and ligated and into each wound a long strip of vaselined gauze is inserted to prevent the recently cut skin edges from adhering to each other and thus obstructing drainage. No drainage material of any kind is put into the joint. A gauze dressing is placed over the wound and a towel is slipped under the knee and loosely pinned over this dressing. On subsequent dressing the towel will be unpinned and the edges laid back, obviating the use of bandages, which are hard to apply in this particular case. The knees are each supported in a Hodgen splint, which is slightly bent (15 to 20 degrees) at the knee, and both splints are suspended on a Lyle frame and counterpoised, so that the patient can raise himself up and down without bending his knees. With both knees drained, as in this case, it is impossible to have the patient up and about, so he is carefully instructed as to the value of active efforts on his part to move the joints. It is desirable to obtain 20 degrees of flexion and full extension of the knees at least four times a day. To facilitate the motion in this case where the patient is weak and does not understand the situation any too well, we have attached adhesive plaster to the sole of each foot which runs to a pulley on the frame by means of rope. This rope is then run through another pulley just above his head allowing the rope to fall into the patient's hand. By pulling on the rope the knees are extended in the Hodgen splints.

NOTE.—In ten days the knees were taken out of the splints and allowed to rest on the bed. The adhesive was removed from the soles of the feet, and the rope upon which the patient pulled to exercise the knees was attached to canvas which ran under each knee. Traction on the rope caused flexion of the knee. At the end of three months the patient had about 40 degrees of flexion and full extension of both knees.

CLINIC OF DR. HUGH McKENNA

ST JOSEPH'S HOSPITAL

SPINA BIFIDA—CLOSURE OF DEFECT BY FLAP OF CARTILAGE AND BONE

THE patient we have for operation this morning is a little girl nine months old, who was admitted from an infant asylum so that it is impossible to get any information regarding the parents. The patient was referred to my service by Dr. Charles Schott, head of the Pediatric Department.

As you will note, the child is in good general condition and a perfect specimen physically aside from the tumor situated at the lumbosacral junction. Examination reveals a soft, fluctuating mass about the contour and size of half of a small apple. Over the lower half of this mass is a cartilaginous or bony protuberance, the base of which appears to hinge on the posterior surface of the vertebra just below the base of this tumor. The superficial part of this protuberance is movable.

In making a diagnosis one must take into account that the anatomic site the lumbosacral region, usually shows a spina bifida of the meningocele type.

I am making a curved incision through the skin and fat down to the sac. I find that the sac is made up of a very thick layer of fat that protrudes from the cleft in the vertebra and shows a definite line of cleavage between this layer and the surrounding superficial fat. I am now denuding the sac of the overlying fat, and I find that after the removal of this fat the sac slips back into the canal with ease. The unyielding substance previously described as making up a part of this tumor proves to be a semi-bony and cartilaginous flap that apparently has failed during the embryologic stage to close in its upper margin. By utilizing this flap I am able to get a very firm closure without much fear of recurrence. I am, therefore, going to drop the prepared sac

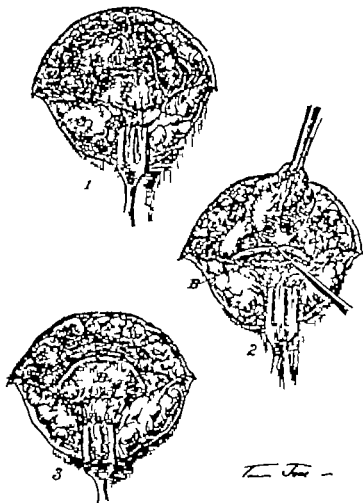


Fig. 330.—1, Sac exposed (A) with overlying cartilaginous flap (B). 2, Sac (A) freed from flap (B) and ready to be dropped back into canal. 3, Flap (B) completely covering defect and sutured to vertebra by three mattress sutures.

back into the canal without opening it, as this procedure will lessen the danger of the operation from the standpoint of infection. The sac drops back freely enough to assure me that it will cause

no symptoms from pressure on the nerve structures. I am now filling the bony cleft of the overlying soft tissues in order that I may approximate the flap which has been prepared, to this denuded surface with the hope that a bony union may take place, thereby rendering the defect caused by the spina bifida permanently repaired. I am securing the flap to the vertebra by means of chromicized catgut, putting in three mattress sutures, which I find make an accurate approximation. I am closing the wound in the ordinary way.

The patient will be placed upon her stomach to prevent unnecessary pressure over the wound.

Note—The patient has been observed over several months, and her recovery has been uneventful.

CLINIC OF DR. CARL BECK

NORTH CHICAGO HOSPITAL

TUBERCULOSIS OF APPENDIX AND BOTH ADNEXÆ

Summary: Primary tuberculosis of the appendix with extension to tubes and ovaries. Cure by removal of appendix and adnexa, with subsequent x-ray treatment.

THIS patient is a married woman, thirty three years old who comes to us because of progressive general weakness and loss of weight. She has never been pregnant nor have there been any miscarriages. Menstruation is irregular. Examination shows normal heart and lungs. There are no abnormalities in the abdomen except in the genital tract. She has a whitish discharge from the vagina. The uterus is tender and retroverted. The left ovary and tube are enlarged and very sensitive. The right side seems to be free, but there is considerable resistance of the muscles on this side. Clinical examination supplemented by fluoroscopic examination shows no abnormalities in the stomach or intestines. The appendix region is not painful or tender. Urine examination is negative. Considering the pathologic conditions of the adnexæ, we have made a tentative diagnosis of tuberculosis of the genital tract.

We are making the usual laparotomy incision. On opening the abdomen the peritoneum and intestine show no evidence of a pathologic condition. The appendix, however presents a most remarkable appearance. It consists of two parts, a proximal and a distal. These two portions are separated by a defect, as though one-third of the appendix had been resected (Fig. 381). The distal portion is swollen and filled with a cheesy material. On its outer surface are a few tubercles (Fig. 381 B). Both ovaries are considerably changed. They are covered with

rapidly from the operation. By the end of four weeks she had gained 20 pounds. The pains in the abdomen and general symptoms disappeared. She was given x-ray treatments during her convalescence. We believe the x ray treatments not only accelerate recovery but in some cases produce a permanent cure of the tuberculosis.

tubercles the left one more so than the right. There are some tubercles on the tubes.

The tuberculosis was apparently primary in the appendix. The central portion of the tubercular appendix sloughed, emptying its contents over the surface of the ovaries and tubes. Gradually some of these tubercle bacilli have found their way into the tubes. The uterus appears normal and, therefore we shall not resect it. We are removing the appendix and the

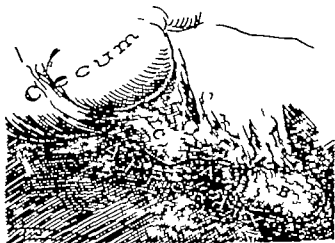


Fig. 341.—Shows normal appearance of appendix. Note defect (A) which divides the proximal (C) and distal (D) portions as if the middle third had been resected. Note tubercles on distal portion.

adnexa in the hope that cure of the tuberculosis may take place. We close the abdomen in the usual manner.

As soon as the patient recovers sufficiently from the operation x-ray treatments will be instituted. We have had a number of cases of tuberculosis of the genital tract and the appendix which have remained permanently well after removal of the appendix and adnexa and subsequent x-ray treatment.

After-history—The subsequent result in this case proved that we were correct in our assumption. The patient recovered

ARTERITIS OBLITERANS

Summary Arteritis obliterans disease peculiar to people of the Jewish race coming from Russia, Hungary and the Balkan States. A successful method of treatment.

THIS man is a Russian Jew thirty-eight years old, and a tailor by trade. For a number of years he has been suffering from pain in his feet. A number of sores have developed on the toes. On the right side the ulcerated condition is confined to the great and second toes, while on the left side a good-sized portion of the great toe has grown to the second toe, the largest portion of which has sloughed out. The fourth and fifth toes on the left foot are considerably affected. The ulcers are yellow in color and covered with a scum. They are discharging a small quantity of pus and some portions of the bones are distinctly protruding. The circulation of the toes and feet is very poor. Both feet are slightly bluish in color and the skin is thin, atrophic, and dry.

The radiograph of the left foot shows destruction of the first phalanx of the great toe, almost total destruction of the second toe and considerable change in the third and fifth toes. On the fourth toe the destruction reaches down into the metatarsal bone. The radiograph is very interesting because it shows the lack of calcareous material in most of the phalangeal bones and a great deal of atrophied bone in those which are not destroyed.

The radiograph of the right foot shows an absence of a considerable portion of calcareous material. Most of the phalanges are atrophied, very much thinner than they ought to be.

General examination shows the patient otherwise healthy. He has no defects or sickness of any kind.

He has had all kinds of treatment, local applications of every description, and even some surgical treatment.

This condition is known as arteritis obliterans. It occurs particularly in people of the Jewish race coming from certain

ARTERITIS OBLITERANS

~~Sensory~~ Arteritis obliterans disease peculiar to people of the Jewish race coming from Rumania, Hungary and the Balkan States. A successful method of treatment.

THIS man is a Rumanian Jew thirty-eight years old and a tailor by trade. For a number of years he has been suffering from pain in his feet. A number of sores have developed on the toes. On the right side the ulcerated condition is confined to the great and second toes, while on the left side a good-sized portion of the great toe has grown to the second toe, the largest portion of which has sloughed out. The fourth and fifth toes on the left foot are considerably affected. The ulcers are yellow in color and covered with a scum. They are discharging a small quantity of pus and some portions of the bones are distinctly protruding. The circulation of the toes and feet is very poor. Both feet are slightly bluish in color and the skin is thin, atrophic, and dry.

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Fig. 182.—1, Photograph showing the extent of destruction of the toes. Note the deep ulcer on the left great toe. The second and third are almost completely destroyed and the fourth one is missing. On the right foot there is an ulcer on the side of second toe. 2, Roentgenogram of left foot showing the pathologic changes. The first phalanx of the great toe has been destroyed by the disease. There is almost total destruction of the second toe and considerable change has occurred in the third and fifth toes. On the fourth toe the destruction reaches down to the sesamoid bone. 3, Roentgenogram of right foot. There is an absence of a considerable portion of calcareous material. Most of the phalanges are atrophied and very much bony in normal.

districts of Russia, Hungary and the Balkan States, although it is known to occur in people of other nationalities. Many

methods of treatment have been advised none of which have accomplished much in the way of cure. We have found out accidentally rather than by being able to give a satisfactory explanation for its use, that a certain treatment or combination of treatments gives a hope of arresting this condition. It consists in bathing the affected part daily in hot and cold water alternately. This patient will be instructed to dip his feet in hot water for fifteen or twenty minutes, then into cold water for the same period. The water must neither be hot enough to scald or cold enough to produce a chill, but of a temperature that can be borne comfortably. This treatment improves the local circulation. At the same time he is given three times a week a duodenal infusion of a few quarts of Locke's solution.

Postscript.—This treatment given for two months has completely cured the patient.

TUBERCULOUS ARTHRITIS OF THE KNEE-JOINT: AN KYLOSIS IN A FAULTY POSITION; KNEE JOINT RE SECTION

Summary Ankylosis of the knee to almost right angle the result of tuberculous arthritis. Correction of the deformity by resection of the joint. Knee-joint tuberculosis unaccompanied by deformity of the limb better treated by the x-ray and hygienic measures than by resection. Danger of too much bone resection in children.

THIS boy nine years of age has been sick for the last three years. The trouble began with pain in the right knee so that he walked with a limp. Gradually the knee swelled, preventing him from stepping on the right foot with his full weight. After a lapse of time the parents consulted a doctor who advised an operation, to which they consented. The knee was opened below the knee-cap and pus and granulations removed and evidently also a part of the capsule below the knee-cap. The leg was placed in a plaster cast. After a time the wound healed and the cast was removed. However the knee gradually began to flex more and more until at the present time it is almost to a right angle (Fig 383 1). He walks with a great deal of effort and pain putting his whole weight on the left leg. We have to deal now with a knee joint ankylosed in a faulty position.

There are several very interesting symptoms to be observed in this child. In the first place the upper part of his body is well developed. There is no disease of the lungs. His right hip is lower than the left, and consequently the pelvis is somewhat tilted toward the right side. This makes the left inguinal crease deeper and more prominent than the right, the shallow border of which is shown very clearly in Fig 383 1 2. The left leg is considerably stouter and more muscular than the right, due to the hyperactivity of this side. The right leg which is the afflicted one shows a very thickened knee joint and what appears to be a cold abscess just back of the knee joint. Below the

knee is the scar of the former operation. The knee is ankylosed to not quite a right angle. However the tilt of the pelvis makes it necessary that the child throw the upper body backward, forming a typical lordosis. Radiographic examination shows that the main trouble is in the patella, which is almost entirely destroyed.

Were it not for the faulty position of the knee-joint, the tuberculosis could be treated and healed with the aid of the



Fig. 283—1, The knee is ankylosed at an angle of little more than 45 degrees. The scar of the previous operation can be seen below the knee. The left leg is greatly hypertrophied. There is secondary tilt of the pelvis with lordosis. 2, Front view showing position of pelvis. The right hip is lower than the left and the right shoulder is higher than the left. Note the difference in the inguinal creases. 3, Shows the corrected position with the leg in plaster-of-Paris cast.

x-ray without an open operation. However it is necessary to correct the deformity before anything further can be done. We have, therefore, decided to make an attempt to move the knee in a more favorable position. The most favorable position in this case is a straight one with only very slight flexion. It is not good plan to overstretch the knee in backward direction unless absolutely necessary on account of the extent of the disease. It

is only necessary to have a position so straight that the pelvis will not tilt, so that the patient may put weight upon the right leg and walk without difficulty.

To accomplish this purpose we will make a wedge-shaped excision of the knee joint. We are making a transverse incision below the knee-joint, dissecting the skin upward so as to expose the whole front of the joint. We find that the patella is destroyed in its interior portion, but that the knee-joint itself is only affected on the surface by a typical granulomatous mass. A portion of the capsule was evidently removed at the former operation. There is very little change in the surface of the tibia and the cartilage is more or less normal. There are some adhesions of the joint surfaces. These adhesions are readily separated. The under part of the capsule above the patella is filled with tubercular pus and granulations, about a cupful of pus escaping after the patella is removed. We have scraped this surface quite free of granulations, cutting away every part of the capsule which seems to be diseased. We now cut out a wedge shaped piece from the end of the femur and a similar piece from the tibia, so that when the leg is stretched the two bone surfaces will come together with little or no tension. We now unite the capsule in front with a few catgut sutures. A tube is inserted into the abscess cavity and the incision closed.

We shall keep this leg on a splint for about a week. At the end of that time the stitches will be removed and a plaster cast applied (Fig. 383 3). He will then be given x-ray treatments to destroy whatever tuberculosis remains. We hope to get a union of the bones and a cure of the tuberculosis.

At present we are not doing very much surgical work on knee joints affected with tuberculosis unless they are in such abnormal positions, as was the case with this patient. In most of the instances we cure the tuberculosis with the x-ray leaving, as a rule, a functioning knee joint or at least one fixed in a good position so that the patient can walk. In former times many of these knee-joints were operated upon. In most instances when the knee-joint was not much affected in its bony part the tuberculous portion of the capsule was resected, with the result

that the knee-joint was ankylosed in a straight position by a fibrous scar forming around the knee joint and obliterating it.

In cases of tuberculosis within the bony portion of the joint it is always necessary to do a resection. As a rule a transverse resection produces very good apposition of the bones and good union, though at times the knee is bent backward—a *genu recurvatum*. Such a position is extremely disagreeable, inasmuch as it increases with time and is much harder to heal than the *malposition presented in our patient this morning*. In children we should resect the bones as little as possible because of danger of interfering with the epiphysis and subsequent growth of the bone.

CLINIC OF DR. CHARLES MORGAN McKENNA

ST. JOSEPH'S HOSPITAL

STONE IN THE URETER

Summary Necessity of careful roentgenographic and cystoscopic examinations in patients giving history of recurrent attacks of right-sided abdominal pain which are not consistent with being attacks of appendicitis. Technique of removal of stone by the open method in present case. After-treatment.

THIS case is interesting because the patient gives a history of recurrent attacks of pain for the past twelve years. She is forty-eight years old and has had these attacks of pain in the right lower quadrant of the abdomen as frequently as three or four times a year over this period of time. I was called to see her in an emergency as it was believed she was suffering from an attack of acute appendicitis. In fact she had been sent to the hospital once before and prepared for operation in the belief that she had appendicitis, but peculiar as it may seem the blood findings did not coincide with the amount of pain she was having, although the pain and distention of the abdomen were directly over McBurney's point. When I was called to see her in consultation she had the pain and distention in the same location, with a great deal of tympanites over the right side. The pain was well marked in this region and she also complained of much pain in the corresponding region of the back.

After a thorough examination she was sent to this hospital, where a blood examination was made. There was nothing in the report that would point to an infection. She gave no history of frequent urination, which is one of the very common symptoms of patients suffering with a foreign body or calculus in the ureter or kidney. There was no history of having passed blood in the urine at any time, and it was for that reason, I believe,

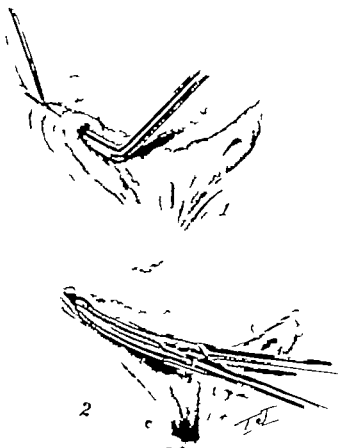


Fig. 344—1 Introduction of right-angled grooved director into normal ureteral orifice. As incision is made over the grooved director through which the stone can be removed. 2) In that way the forceps employed to grasp the stone can be inserted much farther into the ureter preserving the normal sphincter of the ureteral orifice.

that the many physicians who have visited this patient never suspected stone. I cannot understand why a Roentgen ray examination was never made.

On coming to the hospital she was immediately prepared for roentgenographic examination, being first sent to the cystoscopic room, where a complete cystoscopy was done. It was no trouble at all to pass a No. 6 catheter into the right ureter for a distance of 3 inches from the ureteral orifice, but at this place the catheter met with an obstruction and would not go any farther. We then graduated our catheters downward using the smallest size catheter but still could not pass the obstruction, 6 cm. from the orifice. On passing the catheter we got a metallic click, which assured us we were dealing with a stone and not a stricture. This is an important point, as the treatment for calculus is so much different than for stricture. The catheter was introduced into the opposite side without any difficulty and the urine withdrawn and sent to the laboratory for routine examination. After spending some time trying to pass the catheter into the right ureter where the suspected pathology existed, we injected a few drops of olive oil and sent the patient back to her room.

The patient was relieved of pain after the first day in the hospital and did not complain of it for some time, although she reported at intervals of seven to ten days, at which time we injected the various lubricants. At each examination the measurement seemed to remain that of 6 cm. and the x-ray plate which was made showed the stone to rest in the same position. On the last examination I was able to introduce a No. 4 catheter well above the stone, and I felt that we had solved the problem of removal of the stone without an operation. You remember that I have mentioned many times in this clinic that we use all the methods of trying to remove a stone in the ureter before cutting down on it. A celebrated surgeon once said that we never hear of physicians undergoing an operation for stone in the ureter because they know that the large majority of stones passed without surgical interference. I believe that most stones will pass regardless of size. You remember this patient has had periodic colics for twelve years, and it is my judgment that the stone was well faceted and partly off the urinary tract. In this way the stone does not interfere with the routine work of the

kidney unless it is pushed a little bit out of its usual axis. When it does, it is manifested by severe pain and colic, as this patient has shown.

It is only the last few days that we have decided to operate on this case. She has had as many as five or six colics during the past three months. We have now made eight injections of oil, and in spite of the treatment the measurements and roentgenographic examination show the position of the stone unchanged. She is willing, in fact has even asked, to have the stone removed surgically and it is this operation that we are going to do this morning.

You notice that the patient is prepared in the same manner as are all patients for suprapubic cystotomy or any bladder operation through the suprapubic space. This morning I am going to use local anesthesia. We will use $\frac{1}{2}$ per cent. novocain by the nerve-blocking method. This will work very well down to the bladder and even through the bladder but the question in mind is whether or not we can remove the stone in the ureter with this same anesthetic, but it is in my opinion well worth trying.

The bladder has been well distended with water which brings it up into the perivesical space, and keeps the peritoneum from coming in the line of our incision, and makes the bladder very much more accessible. The first part of the incision is made rather small and well down toward the symphysis. I think it is always well to make the incision in the skin large enough so we will have no difficulty in exposing the bladder wall. You notice that the fat on this bladder is very thick and conceals the bladder. The patient complains of no pain as we push the fat off the bladder wall. We do this so as to expose the margin of the bladder and to have a clean line for suture afterward. It also does away with the danger of fat necrosis, because this is a good media for infection. The bladder is now open. The catheter which was inserted into the bladder at the beginning of the operation is still in place. We use a very large catheter in the ureter and clamp it off. As soon as the opening is made in the bladder we release the catheter so as to keep the water

which has been in the bladder from running over the abdomen and the sterile linen. I make a point of this for the reason that it does away with a messy operation. Thus far you see, we have only used two ligatures, and you might say that so far it is a bloodless operation. In another operation using the same incision we might have as many as eight or ten bleeding points.

With the retractors well in front it is easy to locate the ureter. I am going to try to locate the stone with this right angled forceps. You notice that the long axis of this forceps is about $3\frac{1}{2}$ inches in length. This forceps has been made especially for introduction into the ureter. I am going to try and bring the stone down through the ureteral opening. You will remember I said that in our various measurements we never got the stone down below 6 cm. from the ureterovesical opening. Hence, we know just how far up we have to go. We have trouble in introducing the forceps. I push the forceps up just as far as I can and by dilating the ureteral orifice I can just feel the stone. I am now trying to grasp the stone between the jaws of the forceps, but they seem to slip over the top of the stone, which indicates to me pretty well that the stone is not faceted and is located a little posterior to the normal channels of the ureter. I will not spend much time trying to bring the stone down in this way but will introduce into the ureter a right-angled grooved director and split the mucous membrane of the bladder over the ureter and about 3 cm. above the ureterovesical orifice. In this way I will be able to introduce the same forceps into the ureter and use it at a better angle than I could when introducing it through the normal channel as I did first. You have all seen surgeons slit the orifice with a scissors, thereby making a larger opening and giving more room. I think it is well always to have the normal ureteral sphincter intact as long as the same opening can be made through the mucous membrane above. It is a very simple matter to put in a suture, if necessary in closing the wound. We now have no trouble in placing the jaws of the forceps on either side of the stone. The only point I want to emphasize is the removal of the stone without crushing it. We must be very careful in lifting the stone out and bringing it

down, because if even one little portion of the stone is left in the ureter it will serve as a nucleus for the formation of new stones. Here is the stone, and I believe we have it intact. I will examine it before passing it around. You will notice the peculiar shape of this stone—it is rather triangular and has a fairly well-defined margin. This stone, in all probability has been present here for years, and because of its peculiar shape there was no possibility of its coming down any farther.

Thus far we have consumed but very little time in this operation. We will discontinue the gas anesthesia, which was administered during the removal of the stone as the closure can be made without the use of a general anesthetic. I think this is a very good method of doing any kind of bladder work, especially the removal of foreign bodies, or even prostatic work. The same local anesthesia that was used for the first part of the operation is still in effect, and the sutures can be put in without the patient experiencing any pain. I am using a very fine chromicized catgut suture for the bladder. This may or may not be put in according to the size of your incision. In this case owing to the size of the stone it was necessary to make a fairly long incision—it was at least 1 cm. in length. I do not believe it will do the patient any harm to put in this one stitch to obliterate a fistula from the ureter into the bladder. The bladder will be closed as usual by placing a small tube at the upper angle of the bladder. I have frequently closed this class of case up tight without putting in any drainage. Kollischer has advised this method many times, but where the danger of infection is as great as in this case, I am afraid to take the risk. Hence, I will put in this small tube, which is about $\frac{1}{4}$ inch in diameter. You notice how very careful we are to suture the bladder wall up tight to the tube. We suture the fascia muscle and skin in the same manner up the tube. This suture is called a "water-tight" suture. The urine will be drawn off without giving the patient any discomfort whatever. At the end of seven days the tube will be removed, at which time it will be seen that the skin has suffered no injury or excoriation from overflowing urine. I have said that in prostatic cases the discomfort is obliterated by very

careful suture at the time of operation. When the tube is removed we will have primary healing up to the small opening providing no infection occurs. The small opening will then close in a very few days. I do not believe this patient will have any untoward symptoms and will probably be able to leave the hospital in ten or twelve days.

Some one has asked me regarding the after-treatment in as far as the ureter is concerned. We make it a routine in this clinic always to irrigate the ureter on that side with an irrigating solution, such as sterile water or boric acid solution, to see that there are no fine particles of the stone left in the ureter. I think that is always a very good plan where a stone is removed from the ureter or bladder because even after removal there is always a chance of fine particles being left. Thus far we have never had any untoward results. However I have had re formations of stone after doing prostatectomy where the irrigations were not employed. I think it was always due to blood being allowed to accumulate, forming a nucleus for salty deposits. This patient will be sent back to bed and will be treated as any other bladder case.

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Thus far we have consumed but very little time in this operation. We will discontinue the gas anesthesia, which was administered during the removal of the stone, as the closure can be made without the use of a general anesthetic. I think this is a very good method of doing any kind of bladder work, especially the removal of foreign bodies, or even prostatic work. The same local anesthesia that was used for the first part of the operation is still in effect, and the sutures can be put in without the patient experiencing any pain. I am using a very fine chromicized catgut suture for the bladder. This may or may not be put in according to the size of your incision. In this case owing to the size of the stone it was necessary to make a fairly long incision—it was at least 1 cm. in length. I do not believe it will do the patient any harm to put in this one stitch to obliterate a fistula from the ureter into the bladder. The bladder will be closed as usual by placing a small tube at the upper angle of the bladder. I have frequently closed this class of case up tight without putting in any drainage. Kollischer has advised this method many times, but where the danger of infection is as great as in this case, I am afraid to take the risk. Hence, I will put in this small tube which is about $\frac{1}{4}$ inch in diameter. You notice how very careful we are to suture the bladder wall up tight to the tube. We suture the fascia muscle and skin in the same manner up the tube. This suture is called a "water-tight" suture. The urine will be drawn off without giving the patient any discomfort whatever. At the end of seven days the tube will be removed, at which time it will be seen that the skin has suffered no injury or excoriation from overflowing urine. I have said that in prostatic cases the discomfort is obliterated by very

careful suture at the time of operation. When the tube is removed we will have primary healing up to the small opening providing no infection occurs. The small opening will then close in a very few days. I do not believe this patient will have any untoward symptoms and will probably be able to leave the hospital in ten or twelve days.

Some one has asked me regarding the after treatment in as far as the ureter is concerned. We make it a routine in this clinic always to irrigate the ureter on that side with an irrigating solution, such as sterile water or boric acid solution, to see that there are no fine particles of the stone left in the ureter. I think that is always a very good plan where a stone is removed from the ureter or bladder because even after removal there is always a chance of fine particles being left. Thus far we have never had any untoward results. However I have had re-formations of stone after doing prostatectomy where the irrigations were not employed. I think it was always due to blood being allowed to accumulate, forming a nucleus for salty deposits. This patient will be sent back to bed and will be treated as any other bladder case.

TUMOR OF POSTERIOR URETHRA: REMOVAL BY FULGURATION

Summary Tumor in posterior urethra in patient treated for several years for posterior urethritis. Value of urethroscopy in cases of persistent urethral discharge. Removal of tumor by fulguration.

This patient, Mr. K. aged twenty-seven, gives a history of gonorrhea five years ago. He says that he was completely cured after the first attack but that he has had a periodic discharge. The urine has never been free from shreds during the past five years. He has received a great deal of treatment for the so-called posterior urethritis. He occasionally goes as long as three days without noticing any morning drop. The discharge sometimes appears during the day especially when he goes a long time without urinating.

Every patient suffering with a chronic discharge should be urethroscoped to ascertain whether or not a tumor or a calculus is producing the discharge.

On cystoscopic examination we find the bladder perfectly normal in every respect. On urethroscopic examination we find a large cyst on the left side, a little in front of the verumontanum. The tumor either comes from the sulcus or is connected with one of the openings of the prostatic gland. Through the urethroscope it looks like a retention cyst. We will remove the tumor by fulguration.

With a Guyon forceps we will inject 2 drams of 1 per cent. novocain into the posterior urethra. As the water flows through the urethroscope for the distention of the posterior urethra the tumor can be seen to fall backward toward the bladder. As soon as the flow is stopped the tumor immediately comes forward. We will now introduce the fulgurating point and cut off the tumor at its base. The pedicle is about $\frac{1}{2}$ inch in length and very thin. The body of the cyst is about the size of a small pea. I have now removed the entire tumor which will be passed

out with the urinary stream. Sometimes we get these tumors out *in toto* but at other times they are broken in pieces. In case the tumor is not passed in the urine it will be removed with a Bigelow syringe. You can scarcely tell where the operation

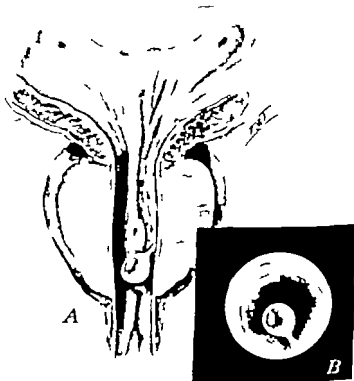


Fig. 333 —A, Vertical section showing cyst in sulcus of posterior urethra. The cyst was removed by fulguration. B Appearance of tumor through urethroscope.

was made. The patient will be instructed to report to the office within three days, at which time the urethra will be examined with the urethroscope.

Some one has asked regarding the prognosis in this particular case. From previous experience I should say that the

man will have normal urine, free from shreds in three weeks. As a rule a chronic discharge with shreds in the urine resulting from foreign bodies, such as cysts, polypi, clears up immediately after fulguration. I would advise that these cases be urethroscopied before treatment of any kind is instituted. The poor results obtained from local treatment in so many cases of so-called posterior urethritis are due to the fact that the underlying cause of the discharge is not ascertained by urethroscopy.

In the after treatment of these fulgurated cases we give 30 or 40 grains of urotropin daily for the first few days. Up to date I have seen no untoward results. These patients do not get an epididymitis, because if there is any infection present it is immediately cared for at the time of operation. Irrigations with 1 : 5000 silver nitrate should be given every second day for a period of ten days. It is my opinion that every patient suffering with a chronic discharge lasting over a period of three months or more, regardless of whether he gives a history of gonorrhea or not, should be immediately urethroscopied. It has been my experience that patients giving a history similar to that of the patient on whom we have just operated go from one doctor to another receiving the routine treatment for posterior urethritis, when the real trouble is some form of tumor in the posterior urethra. I therefore cannot emphasize too strongly the necessity for a thorough examination of every patient.

CLINIC OF DR. ALBERT H. MONTGOMERY

PRESBYTERIAN HOSPITAL

BONE CYSTS

Summary: Osteitis fibrosa cystica comparatively rare lesion. Presentation of two patients with pathologic fracture the result of this disease. Discussion of its etiology pathology diagnosis, prognosis, and treatment.

We have to show you today 2 cases of a rather unusual bone disease. Our first patient is this little girl six years old, who came under my care at the Children's Memorial Hospital on April 8, 1920. She has the following history:

Yesterday while playing at school the child fell striking on her right arm and shoulder. From the detailed questioning it would appear that the fall was very slight and hardly sufficient to fracture a normal humerus. Immediately after the injury the child could not move her arm. Last night it pained so severely that she could not sleep. This morning the patient was brought to the hospital by the school nurse.

Physical examination. She is a well-developed, well-nourished little white child. When I remove this sling from the right arm she persists in supporting the arm with her left hand. The right elbow is held out away from the body. The right shoulder is evidently swollen, but there is no discoloration. As I palpate carefully along the humerus, it is noticeable that she is very tender over this spot, about 2 inches below the acromion. Here in the axilla I can feel the head of the humerus, apparently in the glenoid cavity. If I grasp the arm at the elbow and rotate it gently I can feel a dull sense of crepitation. Measuring now with a tape, from the acromion to the outer condyle of the humerus, the right arm shows 17 cm. in length and the left 18 cm. Carefully placing the child's right hand on her left shoulder

I can easily press the right elbow against the chest, so Dugas's sign for dislocation of the shoulder is absent. We have made a detailed examination of the rest of the body and have found no abnormalities. Analyses of the blood and urine are negative. The Wassermann test has not been made. Most likely we are dealing with a fracture of the humerus, but the possibility of an epiphyseal separation must always be considered in treating these cases in children.

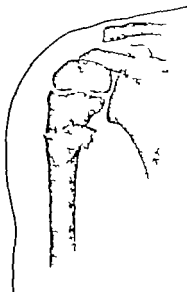


Fig. 386.—Bone cyst of the humerus with pathologic fracture (Case I).

Let us now examine the roentgenograms. In the upper part of this humerus (Fig. 386) we can see a clear egg-shaped area, with a sharply defined border. The regular edge of this cavity is broken by a fracture that extends across it. Bone fragments lie irregularly in the cavity. Where the cortex forms the wall of the cavity you will notice that it has been reduced to linear thickness. Please observe, also, that the upper border of the cavity lies below the epiphyseal line. The bone surrounding this cavity—the periosteum, and the soft parts show absolutely no

changes of any kind. We have taken roentgenograms of all the other bones of the body but have found nothing abnormal.

From the history and the roentgenographic findings I think we can safely make a diagnosis of localized osteitis fibrosa cystica, complicated by a pathologic fracture. The absence of any changes in the structure of the bone around the cavity rules out an osteomyelitic process of any kind. The oval shape of the cavity instead of a globular outline, the definite confinement

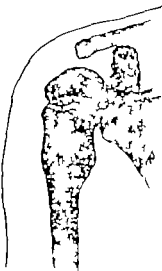


Fig. 337.—Five weeks after injury. Fracture healed. Beginning obliteration of the cyst cavity by bone formation (Case I).

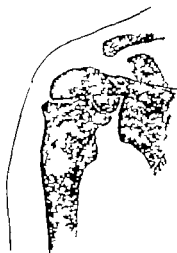


Fig. 338.—Nine weeks after injury. Further filling in of the cyst cavity by bone formation (Case I).

of the lesion within the bone, the tendency to extend down the shaft without involving the epiphysis, and the absence of pain up to the time of fracture speak strongly against a sarcoma.

It is well known that fractures occurring in these cases of osteitis fibrosa cystica heal kindly. In many instances the cyst is cured by obliteration through callous formation. For that reason we will treat this case as a simple fracture. The fragments are in good position, so we will place a pad in the axilla and im-

mobilize the flexed arm by a posterior molded splint, extending from above the shoulder to the wrist.

The splint was removed five weeks later. Bony callus was palpable at the site of the fracture. A roentgenogram taken at this time (Fig. 387) showed definite callous formation and a bony filling in of the cyst cavity. Ten days later movement of the arm was normal and painless.

It is now nine weeks since the injury. The roentgenogram taken this morning shows the cyst cavity almost entirely filled by bone formation (Fig. 388).

Our second patient, whom I assisted Dr. Dean Lewis in treating, is this woman, twenty-nine years of age. She was engaged in housework up to the time of her entrance into the hospital. Her trouble dates back to February 1915 when she fell down a flight of icy stairs. The following morning she could walk, although quite lame and there was evidence of swelling. She noticed, while lying in bed, that she could not flex the thigh because of muscular weakness at the hip. She worked for ten days after the accident, but by that time the pain and limping had become so bad that she went to bed for three weeks. When she again tried to walk the pain was not so severe but she still limped and could not walk upstairs. She then went to a hospital near Boston where a roentgenogram of the hip was made. The physicians told her that it showed no signs of fracture or tuberculosis. They kept her in bed for a month, then applied a cast, and sent her home. Four weeks later the cast was removed and after about a month her pain had completely disappeared and her walking was normal except for a slight limp. She had a little discomfort when she first got up after sitting awhile, but it would disappear on walking. For a year and a half she was fairly comfortable, but in June, 1916 she began to have pain when she walked. The old inability to flex the thigh returned also. After three weeks rest her condition seemed to improve and she tried to walk again. The pain started immediately and bothered her almost every day but she continued to work up to a month before admission, when it became so severe that she had to go to bed. She went to a hospital for ten

days and had another roentgenogram taken, but nothing further was done. Two weeks later while walking down stairs something seemed to snap about the hip and she felt severe pain in the leg. After that she was unable to move the leg. The next day there was considerable swelling about the hip. She was brought to the Presbyterian Hospital October 23 1917.

When this woman entered the hospital a detailed physical examination was negative except for the region of the right hip.

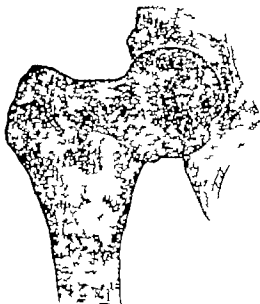


Fig. 389.—Extensive bone-cyst of the upper end of the femur with pathologic fracture of the neck (Case II).

The outer side of the thigh, at the level of the great trochanter was moderately swollen. Definite tenderness on deep pressure was present on the front and side of the thigh, over the base of the neck of the femur. There was some shortening of the right leg. Movement of the leg in any direction was severely painful. Examinations of the blood and urine were negative.

A roentgenogram made on October 23 1917 (Fig. 389) shows a

very interesting picture. You will observe a definite area of rarefaction in the upper end of the femur involving most of the neck and extending down the shaft. This area is somewhat egg shaped in outline and crossed by numerous bony trabeculae. The cortex is markedly thinned in some places, but the periosteum shows no thickening. No evidence of any change in structure is apparent in the bone surrounding the rarefied area. The outline of the femur is normal and unbroken except at the neck, where a line of fracture is present, extending from above downward and inward across the upper part of the diseased bone. Roentgenographic examination of the other bones of the body was negative.

From the history and the roentgenographic findings a diagnosis was made of *osteitis fibrosa cystica*, with pathologic fracture. The absence of any changes in the bone surrounding the cavity ruled out pyogenic osteomyelitis, leuc, and tuberculosis. Sarcoma, especially the giant-celled type, could not be ruled out absolutely but the long duration of the trouble, two and a half years, spoke strongly against malignancy. Operation was advised and accepted.

Operation.—October 25 1917 under ether anesthesia, a longitudinal incision was made in the outer side of the thigh over the great trochanter. The bone was exposed and the periosteum elevated. An opening was made into the cyst cavity with chisel and bone-biting forceps. The wall of the cavity was smooth and quite thin, not more than $\frac{1}{4}$ inch thick in places. The cavity contained a dark brown watery fluid resembling old blood. The curet failed to demonstrate any lining membrane. The cavity was swabbed out with phenol followed by alcohol and then dried carefully with a cautery. The pieces of bone removed in opening the cyst were then placed in the cavity and it was filled with iodoform and glycerin emulsion. It held about 40 c.c. of the emulsion. Muscles and fascia were closed with catgut, and the skin with a continuous beeswax silk suture. A body cast was applied, extending from the costal margin and including the entire right leg.

The wound remained clean. Fixation was maintained until

March 1 1918 when the cast was removed. The roentgenogram at this time (Fig. 390) shows definite bone formation replacing the cyst cavity. Most of the Iodoform emulsion has been absorbed. There is some bony union at the site of fracture. The patient was allowed to move the leg in bed and after a month walking was attempted. A few days later the patient sustained a slight fall, but, fortunately no damage was done. Another

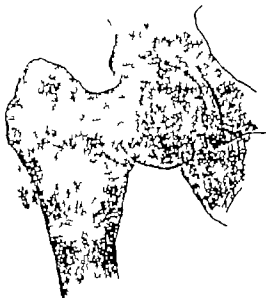


Fig. 390.—Four months after injury. Bone formation filling the cyst cavity. Small amount of the Iodoform emulsion unabsorbed, fracture healed (Case II).

roentgenogram (Fig. 391) taken April 8, 1918 shows a further filling in of the cavity with bone formation. The fracture has united with bony union. On the inner side of the bone the cortex has thickened. Only a small amount of the Iodoform emulsion is left. May 10 1918 the patient could walk comfortably with assistance and was discharged from the hospital.

Today as we observe this patient, two and a half years after her pathologic fracture you will notice that she walks freely

but with a slight limp. Here on the outer side of the thigh is the old operation scar but there is no deformity. The limp is due to some shortening of the leg as a result of the fracture of the neck of the femur.

Our knowledge of bone cysts dates back to Virchow who in 1876 discovered a cyst of the humerus at post-mortem, and on account of the number of cartilage cells in the tissue he ascribed the cyst formation to the liquefaction of a chondroma. Ten

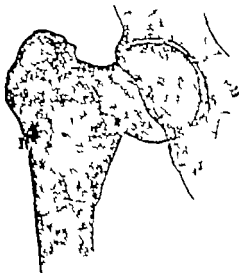


Fig. 391.—Five months after injury. Bone cyst cavity almost obliterated by bone formation (Case II).

years later Rindfleisch found bone cysts in osteomalacia. In 1891 Von Recklinghausen described cyst formation as a generalized process occurring in long bones. From his observations on the pathology he designated the lesion as generalized osteitis fibrosa cystica. Bloodgood, Silver and Elmalié have successively reviewed the cases reported, and their studies have added greatly to our knowledge of this disease.

Considerable confusion exists in regard to the classification of

cysts occurring in bones. Because they are found in a number of pathologic conditions their etiology has been ascribed to various productive factors. Under the headings used by Silver and Landon all the various types of bone cysts may be classified etiologically as follows

(a) Infections and toxins

- 1 Tuberculosis.
- 2 Syphilis.
- 3 Pyogenic.
- 4 Echinococcus and cysticercus.
- 5 Mercurial poisoning.

(b) Metaplasia

- 1 Paget's disease (osteitis fibrosa)
- 2 Osteomalacia.
- 3 Von Recklinghausen's disease (generalized osteitis fibrosa cystica)
- 4 Localized osteitis fibrosa cystica.

(c) Neoplasms

- 1 Cysts resulting from degeneration of enchondromata.
- 2 Cysts occurring in callous formation, subperiosteal hematoma, etc.
- 3 Cysts associated with central giant-cell sarcoma.
- 4 Dentigerous.

The type of bone cysts that we are discussing is the one defined by Silver as being "restricted to the cavities in bones which contain fluid and have no definite connections with disease of the surrounding tissues. Osteitis fibrosa cystica may be generalized as described by von Recklinghausen where many bones are involved or localized where only a single bone is affected.

As to the etiology in the localized form with which our patients were affected, the causative process is still in dispute. Virchow's theory of the liquefaction of chondromata has been generally discarded, as cartilage cells are found only in small numbers and may be regarded as part of a metaplasia. Rehn, from his experiments on pigs, concluded that this cyst formation was only a phase of dystrophy in growing bones, similar to snuffles

disease in dogs. Organisms have been cultured from the cyst fluid in a few cases (Murphy Rapke and Lubarsch, Meyerding) but in most instances the fluid has been sterile. Silver and Landon regard the condition as a metaplastic process. Bloodgood, from careful and extensive studies of a large number of cases, states that the condition is an inflammatory change probably resulting in most instances from trauma. In whatever pathologic way the cyst forms, most writers agree that trauma is the initial cause in almost all cases. Our second patient has a distinct history of injury and traumata are so frequent in childhood that the provocative injury may often pass unnoticed. The disease affects bone during the growing period. Most of the cases reported appeared in young individuals. In one series 70 per cent. appeared in patients under twenty years of age and 85 per cent. in patients under thirty years. The youngest case on record occurred in a child two and a half years old.

The process appears almost entirely in one of the long bones, usually at the proximal end, but bone cysts have been found in almost every bone in the body. Silver in 97 cases found the femur humerus, and tibia involved in 73 per cent. in the relative order named. The cyst may be unifocal or multifocal and may be multiple. Although it forms near the end of a bone, the epiphysis is never affected, expansion occurring in a direction away from the end. The cyst produces marked thinning of the cortex so that fracture commonly results, but the periosteum shows no thickening or other changes. In many cases the cyst wall has no lining, but in older cysts which have been cured previously a lining of thickened granulation tissue has been found. The cyst fluid is reddish brown and watery occasionally containing a few small blood-clots. Bloodgood, from his microscopic studies of the cyst wall, describes an inflammatory layer invading the bone and producing the cyst by gradual bone destruction.

This disease has no characteristic symptomatology. In a large number of cases a pathologic fracture is the first sign of trouble, as in the case of the little girl I have just presented to you. In other instances indefinite pains of a rheumatic char-

acter such as our second patient complained of may be noticed. They are probably due to pressure on the surrounding structures and may cause limping. Atrophy of the muscles from disuse, and deformity of the limb from the growing cyst, may be present.

The history of a traumatic injury in a child or young adult, followed by pathologic fracture of a long bone, should make one suspicious of the presence of a bone cyst. The x ray has been of great value in these cases since Heineke reported its use in 1903. The presence of an egg-shaped cavity well defined and often trabeculated, in the proximal end of a long bone not invading the epiphysis, and showing no evidences of reaction in the surrounding bone, is almost diagnostic of localized fibrous osteitis cystica. In all cases the entire skeleton should be examined roentgenographically to rule out the general form of this disease. Finally however it must be emphasized that the absolute diagnosis can only be made by an exploratory operation and a pathologic examination.

Differentially we must consider (1) Sarcoma. If malignant, this tumor is usually very painful and grows rapidly. The surrounding tissues are quickly invaded. The rather benign central giant-cell sarcoma grows slowly and seldom breaks through the bone, but tends to grow toward the epiphysis and to invade it. In the roentgenogram sarcoma has a globular shape instead of the oval form of the bone cyst. Exploratory operation is often necessary to settle the diagnosis. (2) Syphilia. Here the bone and especially the periosteum will show the bone growth reaction so characteristic of lues. The Wassermann test will also be important. (3) Osteomyelitis. In osteitis alba we may have a cyst containing sterile fluid. However a sequestrum may be seen in the roentgenogram and the surrounding bone will show evidences of inflammatory reaction. (4) Metastatic carcinoma. Occasionally in adults bone metastases may have to be ruled out. The history of the case will show a primary growth of the breast, prostate, adrenal, or thyroid. The roentgenogram will reveal the moth-eaten appearance characteristic of carcinoma in bones.

The outlook is favorable in practically all cases of localized

osteitis cystica. Fractures tend to heal rapidly under ordinary treatment and the cyst may disappear in the healing process. Other cases respond well to conservative surgical measures.

Open operation is the treatment of choice. The cyst cavity is opened, the fluid removed, and the cavity curetted. The cyst wall is then crushed in as thoroughly as possible without completely fracturing the bone. A cast is applied to protect the bone until it has regained its strength. In some cases the bone cavity has been filled with iodoform and glycerin or the Moorhof bone plug, instead of crushing the wall. The results were satisfactory. Resection of the affected portion of the bone, followed by bone-grafting, has been used in other instances. It has been abandoned, however for the more conservative procedures of curetting and crushing.

CONTRIBUTION BY DR. ROY L. MOODIE

DEPARTMENT OF ANATOMY UNIVERSITY OF ILLINOIS

THE AMPUTATION OF FINGERS AMONG ANCIENT AND MODERN PRIMITIVE PEOPLES AND OTHER VOLUNTARY MUTILATIONS INDICATING SOME KNOWLEDGE OF SURGERY

Summary: Surgical procedures evolved first as a form of religious practice or in connection with the appeasing of an angry god or exorcising a demon. Shamanism a cult or form of religious belief closely linked with the development of primitive surgery. Term medicine-man misleading, since shaman is of wider significance and more accurate; shaman being priest as well as healer. Distribution of the practice of finger amputation and its significance. Surgical procedures. Scarring and tattooing, their significance and lack of pathology. A primitive method of hysterectomy. Incising the urethra. Prevalence and antiquity of circumcision among primitive races. Perforation of nasal septum. Scars probably prevented by coating of grease and paint customarily smeared over the body.

The primitive mind worked in a curious manner. If an ancient man performed a procedure which we today call surgery he was not aware of doing anything unusual or unique. When the shaman, medicine man, or priest amputated a finger trephined a head, cauterized a scalp or sucked the pus from a wound he had no intention of counteracting some antagonistic phase of nature, but to exorcise a demon, to let out the evil spirits, or to in some manner appease an angry god. Gods dwelt in every object of nature and the simple mind of man saw only the steps necessary to appease them. Surgery thus had its beginnings and to these simple beginnings we have applied the name of surgery because we have adapted them to other ends. Science of all kinds was nebulous in its origin.

Shamanism from which early surgical procedures were evolved, is well known in many parts of the world as a phase in

religious evolution. All races of men at an early stage of their development display this form of concept in some manner. Although the term was first applied only to the practices observed



Fig. 392.—Silhouettes of hands in red and black, as depicted on the walls of the cave at Gargas, Spiez, of the Aurignacian age (late Paleolithic, possibly 70,000 years old). These impressions of amputated hands and fingers were selected out of a series of over 200 and indicate a truly shocking prevalence of finger amputations among these primitive peoples. Numerous attempts have been made to show that these imprints do not represent amputations, but without success. The custom has doubtless been prevalent since early in the Paleolithic and has endured today. It is the representation of the very oldest surgical procedure older even than trephining. (After Sollas.)

among some tribes of northern Asia, it has lately been more generally used to express the placation and control by magic and fetishistic rites of spirits or demons who are supposed by

primitive man to rule all mankind and, indeed, the whole realm of nature. The shaman was thus not only a practitioner of sorcery able to drive off the spirits which bring death, sickness and misfortune, and to invoke others which confer success and love, but he was a priest, who by communion with the higher powers learns and afterward teaches to others the form of practice used in the cult. The term "medicine-man" is an awkward compound, invented by the early explorers of North America, which is entirely misleading since it conveys some conception of therapeutics. If they had a pharmacal knowledge or any

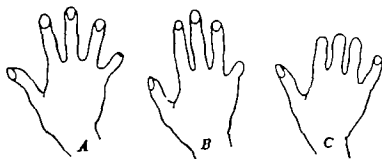


Fig. 394.—Virchow figures of mutilated hands of Bushman seen from the back. *A* Last joint of little finger amputated, but retains vestige of nail. *B* Similar to *A* but with no trace of nail. *C*, The last joint of the first and second finger and the tip of the third have been removed. *A* and *B* Male; *C* female.

idea of healing it was a secondary matter to that of appeasing the spirit.

The practices evolved by a race in its more primitive state were abandoned after they had progressed to a better understanding. Thus trephining was not used as a relief for headaches or to let out the demon after the rise of the conception that the god could be as well appeased by some allegoric object, such as a gourd with an opening which was presented as a trephined head to the god, who would accept it in lieu of the actual operation. Surgery among the primitive races of man is thus a very obscure thing. That primitive men had any definite conception of what constituted surgery is absurd. The processes per

formed by them we call surgery now and they do indicate some knowledge of ligation, stoppages of hemorrhage, sepsis, and the

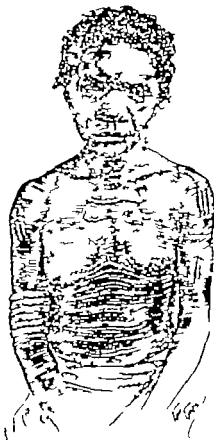


Fig. 391.—A young woman of the Anzies Tribe, Central Australia, showing distortions of the skin. (After Sellen.)



Fig. 391.—Surgical knife used by the Warumpungie Tribe, Central Australia, similar in form to the flint knives used by ancient men. The handle is of wood, decorated with pigment, attached by resin. Such implements may have formed portion of the primitive surgical kit.

like. They had, too, some meager knowledge of anatomy. When an Australian native slashed his arms or body crosswise with a flint knife to make the beautifying scars necessary to his idea of cosmetics he was always careful to avoid cutting any of

the larger arteries. It is, therefore, the intention of this series of essays to point out the procedures among ancient man which indicate any knowledge of anatomy surgery or treatment, on the basis of which a logical evolution of modern surgery may be based.

How or why primitive man came to the conclusion that the amputation of a finger or fingers would appease a god or add to their personal beauty is unknown. We do know however that the later Paleolithic races (the Aurignacian) of France and Spain, who inhabited that country some seven thousand years ago had practised the sacrifice, since they have left silhouettes of hands with amputated finger stumps on the walls of many caves. These silhouettes were made, doubtless, by placing the hand on the wall of the cave and blowing thereon a mouthful of pigment, red ochre, or other mineral pigment with which they used to adorn their residences. The impulse to do this is doubtless the same which induces the average school child to outline his hand in pencil or chalk. At any rate, these silhouettes, protected from the weather in the caves, show us that it is an old custom and we know it persists to the present day.

Such imprints have been found on the walls of caves in California, Arizona, Peru, Africa, and Australia in recent times, and a similar imprint, known as the "red hand," has also been observed in Egypt, Palestine, Arabia, Babylonia, India, Phœnicia, and Mexico. The custom is thus well authenticated. The purpose of the amputation was as various as the countries in which it was employed. It was a symbol of mourning in the Nicobar Islands. It was a sacrifice in India, demanded at the death of a ruler. It was a part of the initiation ceremony among certain Indians of North America to appease a god as a distinguishing mark of caste as a preparation for marriage, and for other obscure reasons.

The operation was often confined to the little finger and was performed by a flint knife, the incision being made at the joint and the first amputation involving only the terminal phalange. Hemorrhage was stopped by a bandage, by applying fats, and by heat, such as a heated stone. Rare cases have been observed

in which an individual, usually a woman, had sacrificed the last two joints of all fingers of both hands. Imprints on the Aurignacian caves of the Paleolithic of France indicate a similar extent of the practice. The surgical aspect of the amputation is obscured in its symbolism, but that it was a surgical procedure is obvious. Ligation was often employed in severing a finger joint. A thread of sinew being bound about the joint was daily constricted until the joint fell off. An Indian youth was observed to place his finger on the sacred buffalo skull and chop it off with a stone hatchet. Such a sacrificial custom indicates some slight surgical knowledge, though of a crude variety.

The primitive races of Australia and some of the races of Africa at the time of puberty or later have a custom of scarifying the body with long, though not deep cuts of a flint knife, involving the skin and superficial fascia. The resulting scar tissue was thought to be very beautiful. Scarification of the tissues for therapeutic purposes has not been seen. Some knowledge of anatomy was expressed by the care that was taken to avoid the larger blood-vessels and few cases of death from hemorrhage have been recorded. The incisions, made a few at a time, bled profusely and no apparent attempt was made to control the flow of blood. The individual was often greatly weakened. To secure a beautiful adornment of the entire body often consumed several weeks or months. It is remarkable that there are so few cases of sepsis involved either in tattooing or scarification, and the absence of keloids to which negroes are especially prone, is an interesting commentary to the oft-recorded observation of the immense resistance possessed by primitive races of man and wild animals. We are thus more readily able to understand the almost total absence of pathology among ancient and primitive races of uncivilized man. We pay for our civilization in terms of pathology and lowered resistance.

An interesting though distressingly brutal, hysterectomy through the vagina, colpohysterectomy is said to be performed as a religious ceremony among certain uncivilized tribes of southern Africa. It indicates some knowledge of anatomy though its purpose was disgusting. In order to have a sterile mate for

a malformed male individual known as the *suka* man, whose penis, through excessive bruising was greatly hypertrophied the uterus and ovaries were removed from a young woman selected for her beauty for this purpose. After the hysterectomy the posterior wall of the vagina was slit with a flint knife as far as the rectum.

The method of procedure is described as follows. A bundle of stiff feathers or stiff plant fiber is introduced and retained in the vagina firmly embedded against the cervix. After some days or weeks the uterus and posterior vagina adhere to the mass of feathers or fiber by reason of the excessive irritation. When the proper amount of adhesion is supposed to have taken place the shaman, usually an elderly man who introduced the mass into the vagina, with proper ceremonies, forcibly pulls out the mass of feathers or fiber using no anesthetic, thus exposing the uterus and ovaries, as well as the everted vagina. The parts are then rudely severed, with proper incantations, with the flint knife and cast aside in abhorrence. The profuse bleeding is stopped in the usual primitive method, cobwebs, application of hot stones or fats, and the posterior vaginal wall incised. That death often accompanies this operation is probable, though there is little data on this point. Primitive people are extremely averse to allowing white men to witness their religious rites, and they are usually performed in some remote fastness of the wilderness where interruption is not expected. Thus among the many native operations of trephining which have been done in recent years among the highland natives of Peru only one has been witnessed by a white man. Our knowledge of these procedures is thus all the more meager.

Another crude procedure, intensely sexual in its nature, known as subincision, is said to be performed by the same races, as well as in Australia. In order to permit sexual indulgence without the intervention of pregnancy the male urethra is severed at the base of the penis. Doubtless the anterior urethra becomes obliterated. This operation indicates some crude conception of fertilization and of the anatomy of the urethra and its function.

The antiquity of the practice of circumcision has been dis-

cussed in a previous contribution, but it will be convenient to mention here its occurrence in Australia where it commonly forms part of an initiation ceremony. There is some reason to suppose that the practice originated as one of the religious rites of making a boy into a man in connection with the rites of puberty about which many primitive races have very elaborate ceremonies into which only the initiated can enter. The custom is very widely distributed and its close association with totemism is well established. Circumcision for both male and female is known among certain tribes of Africa. It is found in Madagascar, many of the Pacific Islands, as well as among the Aztecs in America, the Caribs of Orinoco and the Tacunas of the Amazon. Its origin is probably to be sought among the Paleolithic races, but of that origin we have at present no data, the oldest known representation of the rite being that engraved on the wall of a tomb of the Fourth Dynasty (3000 B. C.) in Egypt. It is frequently associated with subincision.

The knowledge of surgery involved in the act of primitive circumcision was very meager. There was probably never a therapeutic measure in view. Among females the labia minora were excised, often very roughly, bleeding being left largely to care for itself, the result often being a slight deformity.

A singular mutilation, though of slight surgical interest, is the perforation of the nasal septum by certain Australian tribes for the insertion of the "nose-pin," a wooden stick 5 or 6 inches in length, as thick as a man's finger which reached right across the face. Absence of sepsis in this mutilation, as in tattooing and making of cicatrices, may be partly due to the custom of anointing the body liberally with a mixture of grease and red ochre. This protected the body against vermin, so why not as well a protection against bacteria. Fleas, flies, and other insect pests, so active today in the distribution of disease, are said not to have been known by the aborigines until they were introduced by the white men.

Primitive Surgery in Ancient Egypt, Surgical Clinics of Chicago, April, 1920.

CLINIC OF DR. HARRY CULVER

COOK COUNTY HOSPITAL

PAPILLOMA OF THE POSTERIOR URETHRA

Summary: Symptoms of prostatic hypertrophy relieved by prostatectomy. Further cystoscopic examination reveals multiple papillary tumors of the posterior urethra. Removal by snare and fulguration. Epithelial tumors of posterior urethra comparatively rare.

This patient is a man fifty-six years of age, a motorman by occupation, who enters the hospital complaining of inability to urinate.

There is a history of gonorrheal infection thirty-six years ago and a short period of urethral discharge six years ago. The latter infection was classified as non-gonorrheal. There have been no further signs or symptoms referable to the genito-urinary tract until the onset of the present trouble.

In January 1920 the patient first became aware of nocturia, which was but once a night at first, but rapidly increased in frequency until he found it imperative to void at least once an hour during the night. There was but very slight increase in the frequency during the day. The frequency was not associated with pain or other urinary symptoms. Early in February a physician was consulted, who prescribed internal medication, nature of which not known. Patient now noticed a gradual decrease in the size and force of the urinary stream. One evening after an especially long day's work he was unable to start his urine. He was relieved by catheter on this occasion, and once a day thereafter for about a month, when he was cystoscoped the result of which was a diagnosis of hypertrophied prostate.

He was operated on suprapubically April 3d by a competent surgeon, who found only a slight middle-lobe enlargement, which was removed.

The urine drained entirely from the suprapubic opening until May 16th, when this opening temporarily closed and the patient again experienced acute urinary retention. He was then brought to the Cook County Hospital on the service of Dr Vernon C. David.

Upon admission it was impossible to pass any sort of ureteral instrument so the retention was relieved by probing the suprapubic wound, and 30 ounces of very turbid urine were obtained. Urine drained freely suprapublically for five days. Under ether

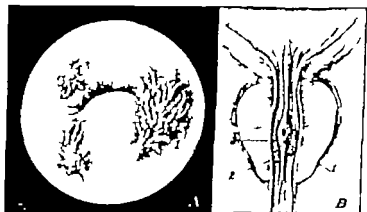


Fig. 396.—A Urethroscopic picture of posterior urethra showing papillary tumors in region of the verumontanum. B Diagrammatic sketch showing relative position of these tumors.

anesthesia a No. 32 French sound was forced through the posterior urethra by Dr. David, who states that there was a very definite resistance just proximal to the cut-off muscle. A No. 24 French indwelling catheter was inserted and the suprapubic wound closed permanently in four days. The patient was then referred to my service.

After suprapubic closure the indwelling catheter was removed and a No. 24 French cysto-urethroscope was passed, with considerable posterior urethral resistance. The bladder mucosa lacked its normal luster and presented a ridge of edema

at the site of the incision, and similar lesions completely encircled the true vesical neck. The vesical neck was not regular but dilated easily and contracted normally. The posterior urethra was essentially normal from the true sphincter distally to the verumontanum. Attached to the distal aspect of this structure was an elongated papillary tumor with a distinct pedicle (Fig 396 A). Other similar but smaller growths were seen attached to the floor and lateral walls of the urethra immediately adjacent.



Fig 397—Low-power microscopic view of tumor (2) in Fig 396, A

Through an operating urethroscope and snare a portion of tissue was removed for diagnosis. The microscopic sections of this tissue presented the appearance of a typical benign papilloma (Fig 397).

The snare was eventually used to remove the bulk of the tumor tissue, while the bases and smaller tumors were removed by fulguration. After the removal of the largest tumor which was done at the first sitting it was not necessary to replace the indwelling catheter as urine was passed per urethrum without obstruction immediately after

Following the intra-urethral procedure a left epididymitis developed otherwise there were no untoward results. The patient returned to work six weeks after the removal of the largest papilloma, having normal urination in spite of persistent pyuria. There is no nocturia at present. There has been no recurrence following the last fulguration two months ago.

Epithelial tumors of the posterior urethra are not uncommon, a fact which is being more and more recognized as means for their identification become less difficult. Undoubtedly many instances of these neoplasms are never recognized, as they are not considered in the diagnosis and therefore, no attempt is made to discover them. However tumors of a size sufficient to produce acute urinary retention are exceedingly rare and for this reason this case is brought to your attention.

BENIGN EPITHELIAL TUMORS OF THE URETER

Summary: Recurrence of symptoms one week after nephrectomy performed for repeated attacks of pain and hematuria. Ureterectomy reveals benign papillary growths.

THE patient is a woman thirty-five years old, who enters the hospital complaining of bloody urine and severe pain in the left side.

Her medical history previous to the onset of the present symptoms has no direct bearing on the present condition. The trouble was first recognized by the patient about two years ago when she very suddenly developed severe pain in the left side and back corresponding to the position of the left kidney. There was distinct tenderness over the kidney at this time. Immediately following the attack of pain the urine appeared bloody. She was given some sort of internal medication for several weeks without demonstrable effect, as she continued to bleed almost constantly and had periods when it became more profuse, and was then associated with pain in the left side and back.

Cystoscopy was done in August, 1919 at which time it was determined that the bleeding was entirely from the left ureteral orifice. Examination of segregated urines gave no evidence of tubercular or pyogenic infection and roentgenograms were negative for stone. In February 1920 after a very severe attack, a blood-cast about the size of the ureteral lumen was passed.

With a gradual increase in frequency and severity of the attacks of pain and also an increase in the amount of blood passed, her physician deemed it advisable to do a left nephrectomy which he did in May 1920. The pathologic report from a reliable source states that the kidney specimen showed a very mild chronic diffuse nephritis, there being no evidence of tumor, stone, or infection.

There were none of the usual symptoms for a week following operation, then bleeding recurred, associated with the most

severe attack of pain yet experienced. The character of the pain was more colicky than formerly and extended downward in front along the course of the left ureter. The attacks have continued since with such marked severity that frequent hypodermics of morphin were required to give relief. The patient has been referred to my service for further urologic examination.

The patient is now three weeks after nephrectomy bleeding rather profusely and complaining of colicky pain along the course of the left ureter. General examination is negative. The urine shows macroscopic blood, but is otherwise negative. The hemoglobin estimation of the blood is 75 per cent., with the cellular content not appreciably disturbed.

Cystoscopy reveals a distinct blood-clot protruding from the left ureteral orifice. Except for the blood-stained vesical mucosa about this ureteral orifice the bladder is normal. The region about the orifice is carefully washed, the clot removed, and close observation made for the presence of tumor but none is seen. A No. 6 skiagraphic catheter is passed 23 cm. up the left ureter before obstruction is met. Drops of bright red blood drop from the end of the catheter. A silver iodid ureterogram is made and the ureter is seen to extend 4 to 5 cm. beyond the point of obstruction. There is no dilatation or tortuosity of the ureter neither are there any extra or intra-ureteral shadows.

A diagnosis of ureteral neoplasm is made and complete ureterectomy advised.

The patient is now prepared for operation. By extending the previous nephrectomy incision downward and forward and drawing the peritoneum forward the ureter is exposed down to within 2 to 3 cm. from the bladder. A large-sized ureteral catheter remains in the ureter to facilitate identification. The catheter is now removed, the ureter ligated, and cut about 1 inch from its entrance into the bladder. The muscles are closed in layers and the fascia and skin closed separately without drainage.

At the time of nephrectomy it has been learned, about 5 cm. of the ureter were removed. Upon opening the ureter it is noticed that the mucosa of the entire structure is blood-stained



Fig. 398.—Cut section of ureter showing papillary tumors (indicated by arrows).

and about 5 cm. from the upper end there is a distinct papillary growth (Fig. 398) which has one long villus and many rather

Indistinct shorter ones. The pedicle is attached to mucosa normal in appearance and consistency. A second very small growth is similarly placed 2 cm. above this one and a third 1 cm. below the largest growth. From its gross appearance the tumor is apparently a benign papilloma.

Primary benign neoplasms of the ureter are very rare, there being but 13 cases of benign epithelial new growths of the ureter reported in the literature to date. Malignant epithelial tumors are more frequent, but are still very uncommon lesions. Indeed, the ureters are many times involved in secondary growths both from the renal pelvis and bladder.

While there is no definite etiology of these neoplasms, it has been observed that they are quite frequently associated with impacted ureteral calculus. Instances are presented to demonstrate the potentially malignant character of these apparently benign structures, as is the case in all urinary papillomas.

The most common symptoms are hematuria, pain, and tumor. The pain is due to hydronephrosis or hematonephrosis caused by the obstruction of the ureter or to real ureteral colic caused by the presence of blood-clots in the ureter. The patient this morning had had both types of pain. Her first pains were undoubtedly due to intrapelvic pressure, while the postnephrectomy pains were typical of ureteral foreign substance. Hematuria has been present in every instance examined and recognized during life. A few postmortem specimens are described where there was no history of hematuria.

Tumor mass is present in over half of the cases and is sometimes the first sign or symptom. The mass in all instances is caused by hydro- or hematonephrosis and not by the actual neoplasm. There was no apparent dilatation of the renal pelvis in our case, nor was there a palpable tumor mass at any time.

The treatment is obviously complete removal of the tumor bearing tissue which amounts to complete nephrectomy and ureterectomy. No instance of resection is on record. The possibility of recurrence or failure to remove all the neoplastic tissue would be too great to attempt such a procedure.

After-history.—Healing was prompt and the clinical effect

striking. Bleeding and pain stopped at once and the patient left the hospital in two weeks. Six weeks have elapsed since the ureterectomy and there has been no return of symptoms.

Microscopic examination showed a typical benign papilloma such as is seen so frequently in other structures along the urinary tract. The ureteral musculature was considerably thickened throughout its course otherwise there were no further changes noted.

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CONTRIBUTORS TO VOLUME 4

- E. WYLLIS ANDREWS, M. D., Professor of Surgery, Northwestern University Medical School; Surgeon in Chief, Cook County Hospital, Chicago; Attending Surgeon, Michael Reese Hospital, Chicago.
- EDMUND ANDREWS, M. D., Instructor in Surgery Northwestern University Medical School.
- CARL BECK, M. D., Surgeon, North Chicago Hospital.
- ARTHUR DEAN EVAN, M. D. Professor of Surgery Rush Medical College, in Affiliation with the University of Chicago; Surgeon to the Presbyterian Hospital, Chicago.
- EDWARD LYMAN CORNELL, M. D., Attending Obstetrician, Chicago Lying-In Hospital and Dispensary; Attending Obstetrician, Provident Hospital Associate in Obstetrics, Northwestern University Medical School.
- CAREY CULBERTSON, M. D. Assistant Professor of Gynecology and Obstetrics, Rush Medical College, Chicago; Assistant Attending Gynecologist and Obstetrician, Presbyterian Hospital, Chicago, Attending Gynecologist, Cook County Hospital, Chicago.
- HARRY CULVER, M. D. Gynecologist to the Cook County Hospital, Chicago; Instructor in Urology University of Illinois.
- VERNON C. DAVID, M. D., Instructor in Surgery Rush Medical College, Chicago.
- BENJAMIN FRANKLIN DAVIS, M. D., Assistant Attending Surgeon, Presbyterian Hospital, Chicago; Instructor in Surgery Rush Medical College, Chicago.
- CARL BRADEN DAVIS, M. D. Presbyterian Hospital, Chicago.
- FREDERICK G. DYAR, M. D., Assistant Professor of Surgery, College of Medicine, University of Illinois, Attending Surgeon, Cook County Hospital, Chicago.
- DANIEL M. EKENBRYATE, M. D. Clinical Professor of Surgery, Rush Medical College, Chicago; Attending Surgeon, Michael Reese and Cook County Hospitals, Chicago.
- J. S. EKENSTADT, M. D. Associate Genito-urinary Surgeon, Michael Reese Hospital, Chicago.
- FREDERICK HOWARD FALLS, M. D., Cook County Hospital.
- DR. GATEWOOD, Instructor in Surgery Rush Medical College, Chicago.
- LEE C. GATEWOOD, M. D., Associate in Medicine, Rush Medical College, Chicago.
- GEORGE D. J. GRIFFIN, M. D., Professor of Surgery Loyola University School of Medicine.
- GEORGE W. HALL, M. D., Associate Professor of Medicine (Geriatrics and Mental Diseases) Rush Medical College, Chicago.
- ROBERT H. HERBERT, M. D., Attending Urologist to Presbyterian Hospital; Assistant Professor of Genito-urinary Surgery Rush Medical College, Chicago.
- ALLEN KAMAVEL, M. D., Assistant Professor of Surgery Northwestern University Medical School; Attending Surgeon, Wesley Memorial and Cook County Hospitals, Chicago.
- GUSTAV KOLECHER, M. D., Attending Surgeon to the Genito-Urinary and Radio-Therapeutic Departments, Michael Reese Hospital, Chicago.
- HERMAN KRETSCHMER, M. D., Urologist, Presbyterian Hospital; Assistant in Genito-urinary Surgery Rush Medical College, Chicago.
- PHILIP H. KREUCHER, M. D. Attending Surgeon, Mercy Hospital, Chicago.
- HUGH M. MACKECHNIK, M. D., Professor of Surgery, Loyola University Medical School, Associate Professor of Surgery Post-graduate Medical School; Surgeon to Frances Willard Hospital.

LEWIS L. McARTHUR, M. D., Senior Attending Surgeon, St. Luke's and Michael Reese Hospitals, Chicago.

CHARLES MORGAN MCKENNA, M. D., Assistant Professor of Gastro-intestinal Surgery College of Medicine, University of Illinois.

HUGH MCKENNA, M. D., Senior Surgeon and President of Staff, St. Joseph's Hospital, Chicago; Associate Professor of Surgery (Extra-mural), Rush Medical College, Chicago.

GOLDER L. McWHORTER, M. D., Instructor in Surgery Rush Medical College, Chicago.

CHARLES LOUIS MIX, M. D., Professor of Clinical Medicine, Northwestern University Medical School; Attending Physician, Mercy Hospital, Chicago.

ALBERT H. MONTGOMERY, M. D., Lecturer in Surgery, Rush Medical College, Chicago; Junior Attending Surgeon to the Presbyterian Hospital, Chicago.

ROY L. MOODIE, Ph. D., Associate Professor of Anatomy University of Illinois, Chicago.

EDWARD LOUIS MOONHEAD, M. D., Professor and Head of the Department of Surgery, Loyola University School of Medicine; Chief of Staff and Senior Surgeon, Mercy Hospital; Consulting Surgeon, Oak Park Hospital.

ALBERT J. OCHSNER, M. D., LL. D., Surgeon in Chief, Aspirators and St. Mary Hospital, Chicago; Professor of Clinical Surgery in the Medical Department of the State University of Illinois.

CHARLES AUBREY PARKER, M. D., Attending Orthopedic Surgeon, Cook County Hospital; Assistant Attending Surgeon (Orthopedic), Presbyterian Hospital, Chicago; Assistant Surgeon (Orthopedic), Rush Medical College, Chicago.

D. B. PEMISTER, M. D., Associate Attending Surgeon, Presbyterian Hospital, Chicago.

GEORGE E. FRANKBAUGH, M. D., Professor of Otorhinolaryngology Rush Medical College, Chicago; Otolaryngologist to the Presbyterian Hospital, Chicago.

KELLOGG SPEED, M. D., Assistant Professor of Surgery, Rush Medical College, Chicago; Assistant Attending Surgeon, Presbyterian Hospital; Attending Surgeon, Cook County and Provident Hospitals, Chicago.

DAVID C. STRAUSS, M. D., Assistant in Surgery Rush Medical College; Associate Attending Surgeon, Michael Reese Hospital, Chicago.

ALFRED A. STRAUSS, M. D., Michael Reese Hospital.

RICHARD J. TIVVEN, M. D., Instructor in Ophthalmology Northwestern University Medical School.

THOMAS J. WATKINS, M. D., Professor of Gynecology Northwestern University Medical School, Gynecologist, St. Luke's Hospital, Chicago.

LEIGH F. WATSON, M. D., Associate in Surgery Rush Medical College.

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